March 1960
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AMERICAN Journal of Public Health

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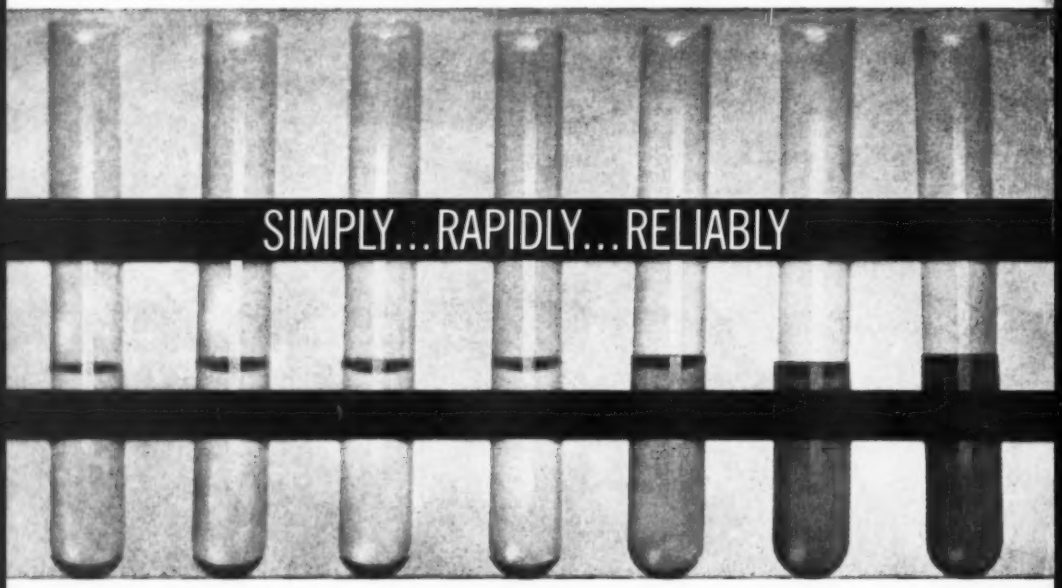

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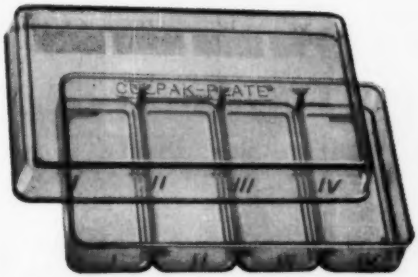

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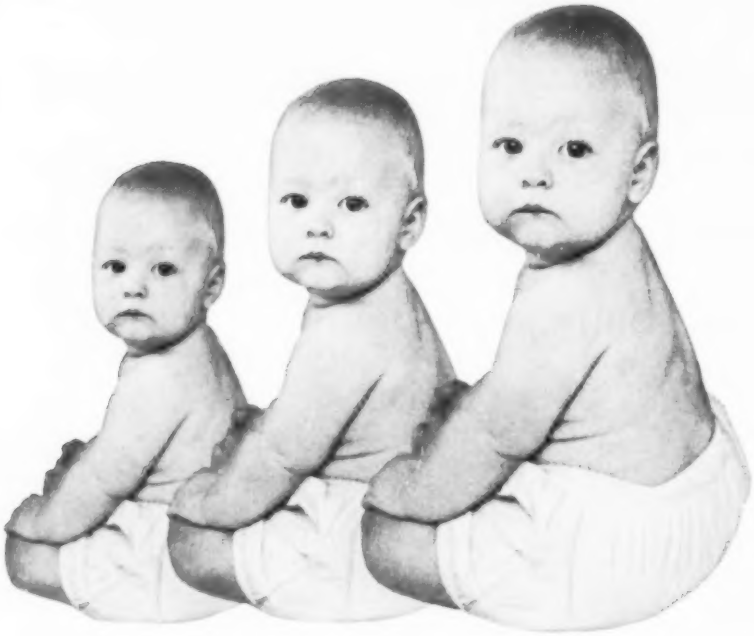

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2. Rinehart, R.E., and Marcus, H.: Incidence of Amebiasis in Healthy Individuals, Clinic Patients and Those with Rheumatoid Arthritis, Northwest Med., *54*:708 (July, 1955).

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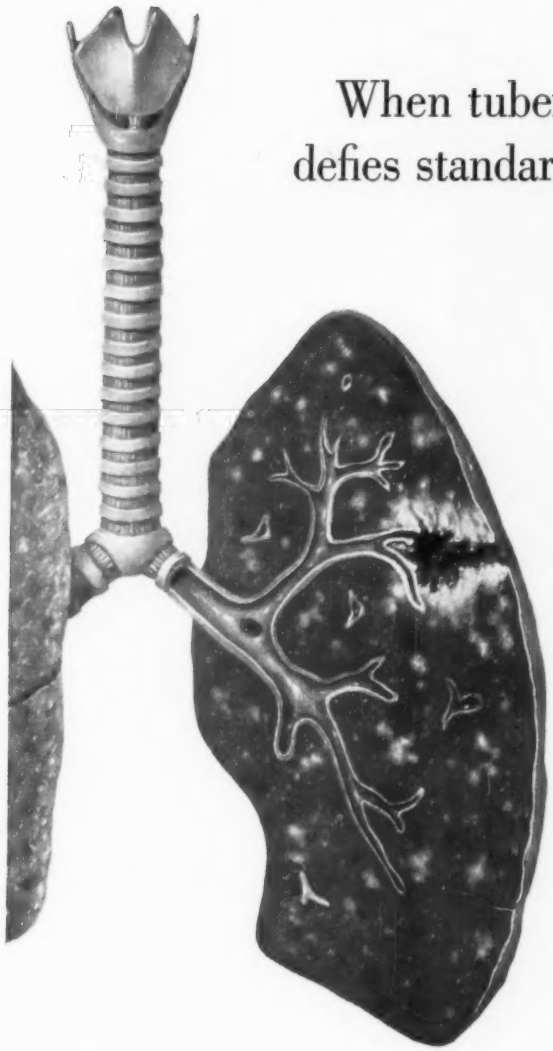

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[2] Ludwig, T. G., and Bibby, B. G., Acid Production from Different Carbohydrate Foods in Plaque and Saliva; Further Observations Upon the Caries-Producing Potentialities of Various Foodstuffs, J. Dent. Research, 36:56 (Feb.) 1957.

[3] Bibby, B. G., Effect of Sugar Content of Foodstuffs on Their Caries-Producing Potentialities, J. Am. Dent. A., 51:293 (Sept.) 1955.

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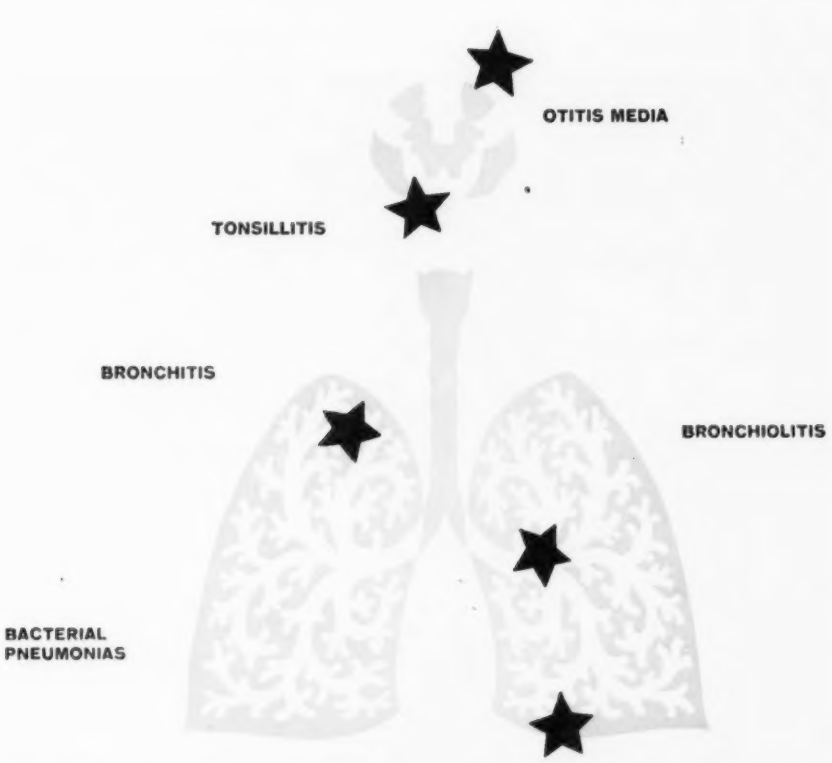

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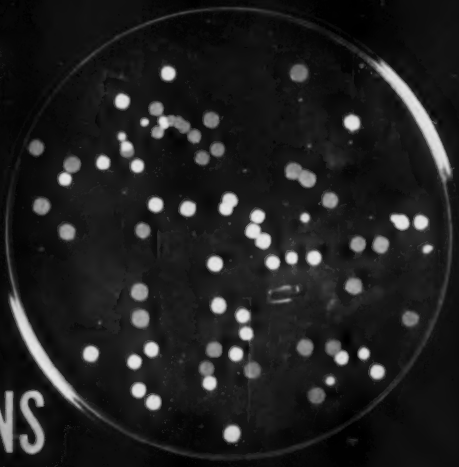

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1. Smith, I. M., and Soderstrom, W. H.: J. A. M. A., *170*:184 (May 9), 1959.

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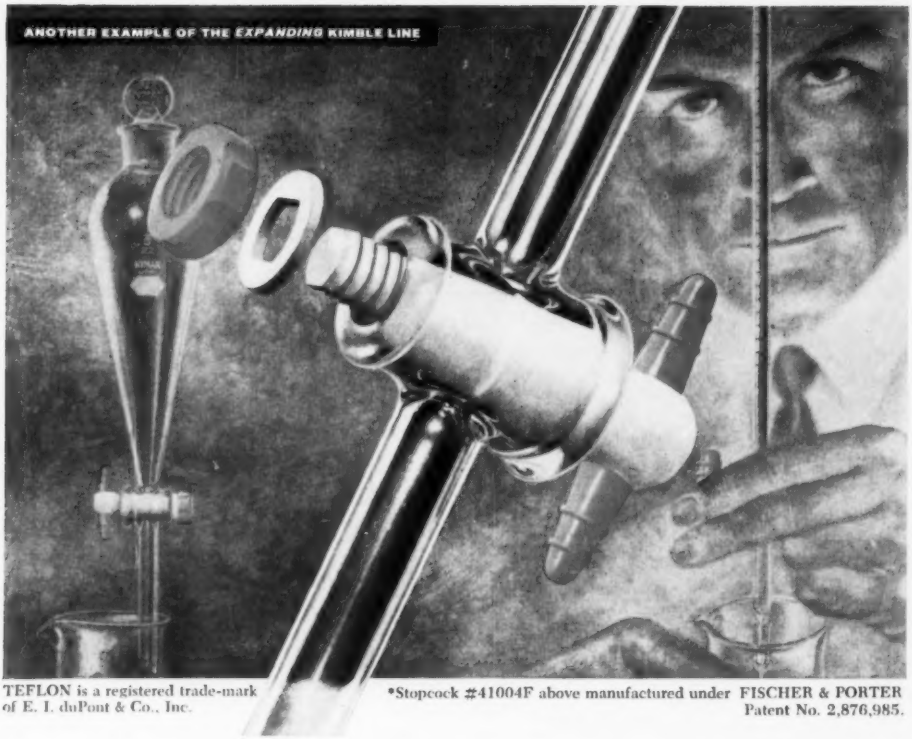

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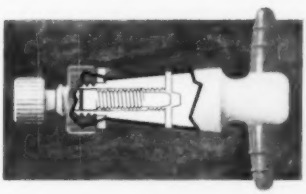

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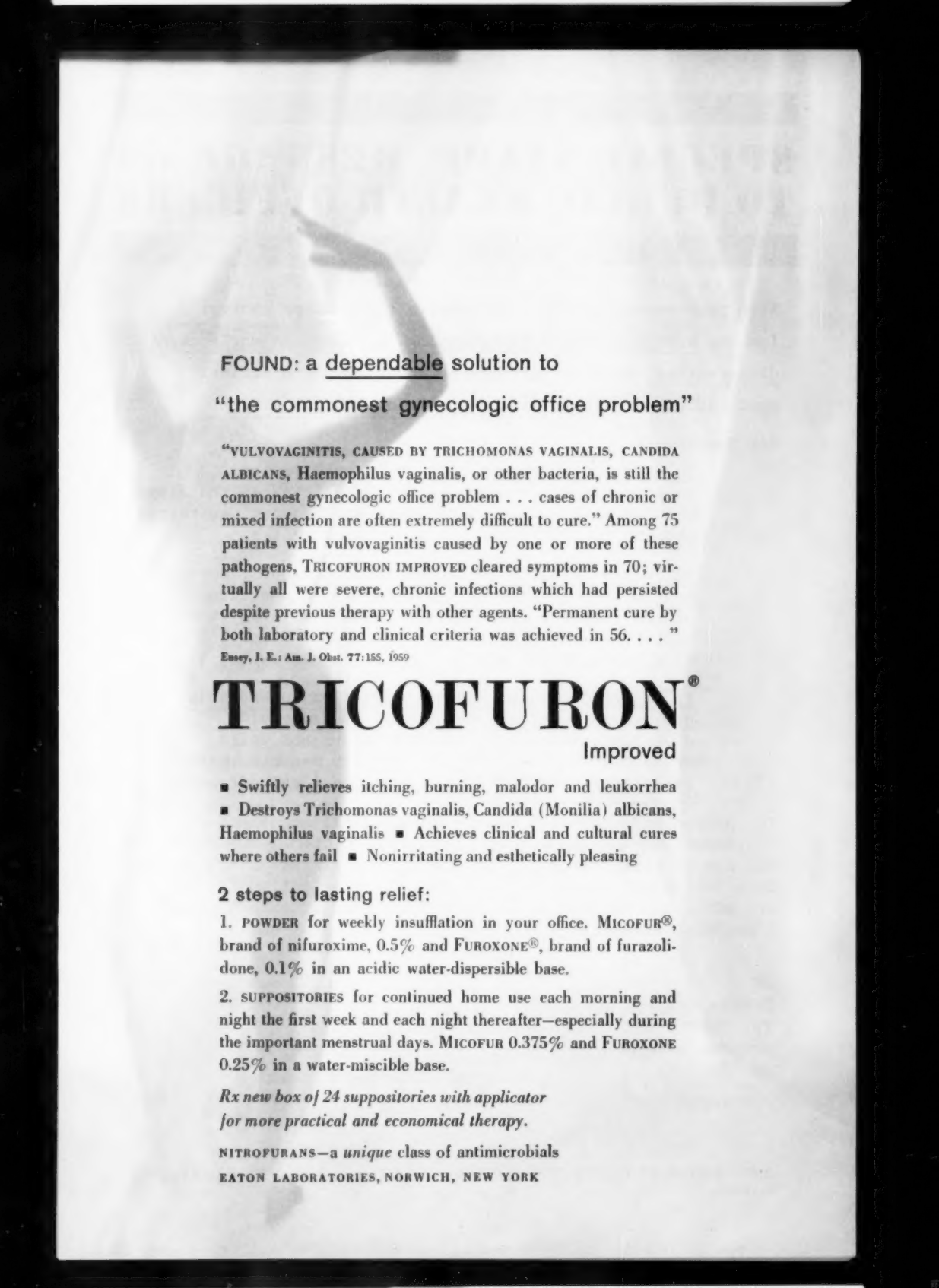

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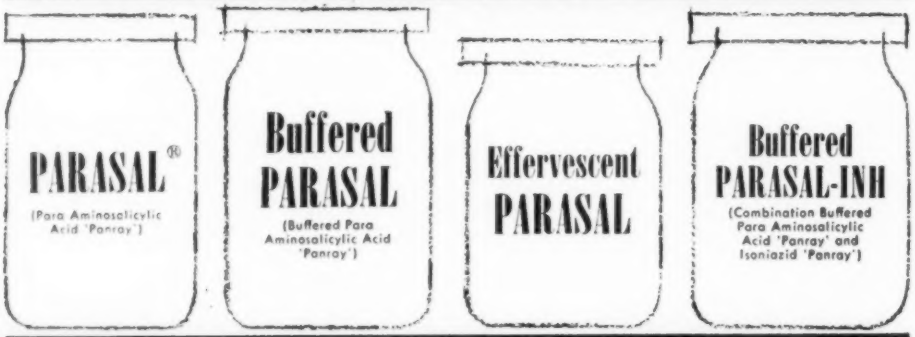

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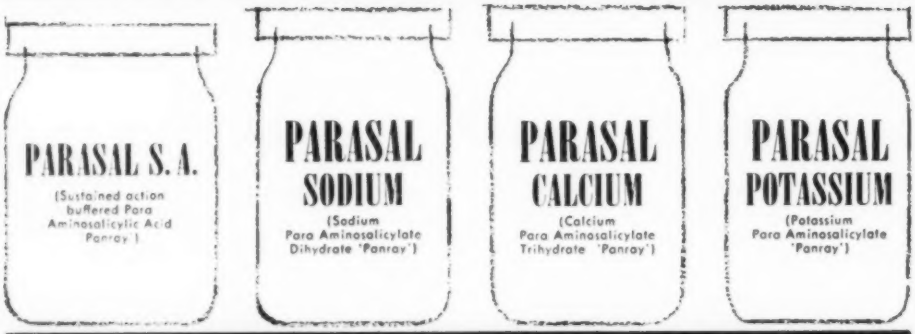

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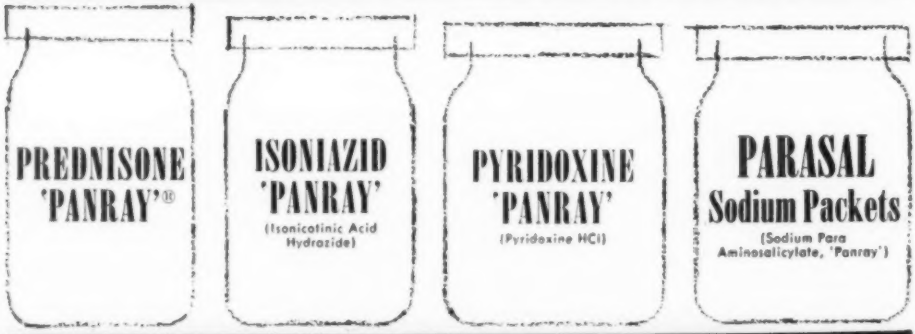

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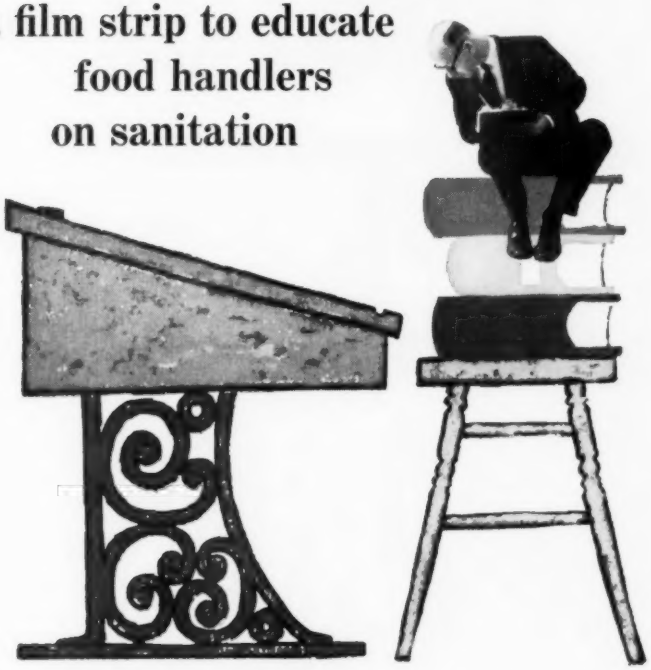

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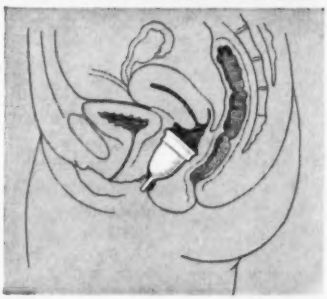

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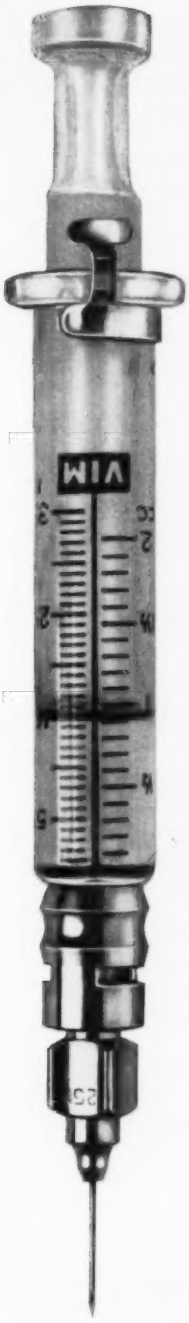

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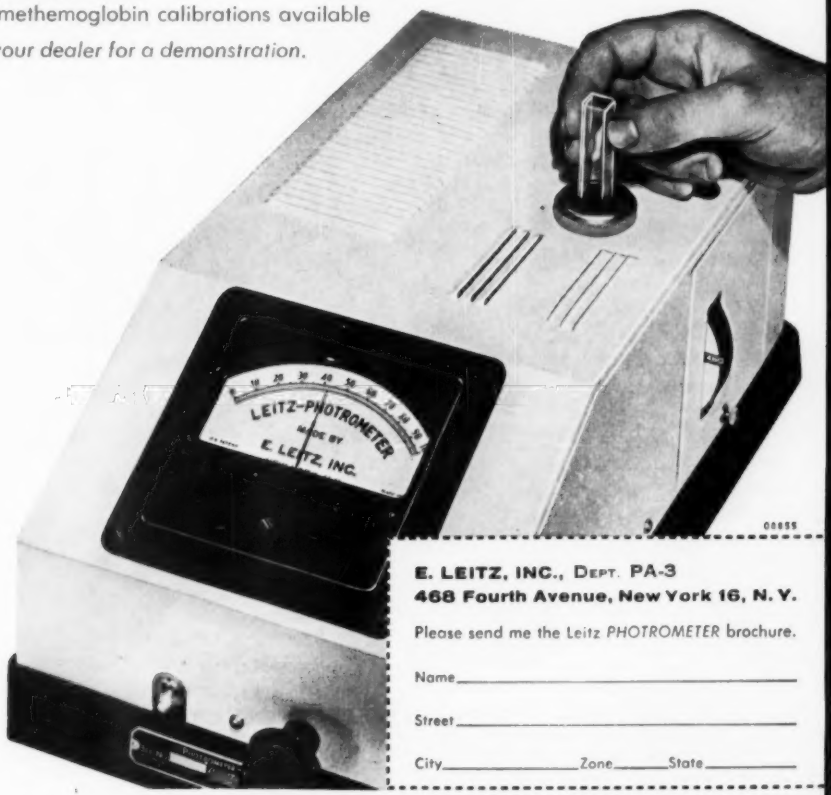

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Journal of Public Health

In this presentation, Dr. Dingle offers a wide ranging view of some of the newer viruses and their relation to minor respiratory diseases. This is the golden age of virology and the author of this paper is a major contributor to this development. Readers of the Journal will find his views of high interest.

THE PRESENT STATUS OF THE PROBLEM OF THE MINOR RESPIRATORY DISEASES

John H. Dingle, M.D., F.A.P.H.A.

WHEN DR. MATTISON asked me to review the present status of the respiratory disease problem in a period of 20 minutes, I was rather overwhelmed. I had initially interpreted this request to mean consideration of the entire scope of infectious diseases of the respiratory tract, including those caused by bacteria, fungi, rickettsiae, and viruses. Such a presentation would require hours if not days. I have chosen, therefore, to limit discussion to the present status of the problem of the minor respiratory diseases, with little or no consideration of the more severe diseases such as tuberculosis, influenza, and primary atypical pneumonia.

First of all, what are the minor respiratory diseases and what is the scope of the problem presented by them? For the most part these illnesses defy sharp clinical definition. They vary from mild, afebrile, coryzal infections such as the common cold, to severe febrile, grippe-like illnesses, sometimes with involvement of the lower respiratory tract, including the trachea, bronchi, and lungs. They may be chiefly limited to the nose and throat, or they may consist predominantly of malaise and chilliness, with minimal evidence of infection of the respiratory passages. For this reason the minor respiratory diseases can be grouped together only by the exclusion of infections due to identifiable known agents—infections which may, in fact, be indistinguishable clinically and epidemiologically unless the diagnostic aids of the laboratory are employed. They thus constitute the respiratory in-

fections of unknown cause and as such they comprise the bulk of the respiratory disease problem.

In a ten-year study of infectious diseases in a group of Cleveland families, for example, it has been found that on the average there are ten illnesses per person per year.[1] Two-thirds of these illnesses, or approximately six illnesses per person per year, are respiratory infections, but 95 per cent of these respiratory illnesses fall into the group of minor respiratory diseases which we have called the "common respiratory diseases." The remaining 5 per cent of the illnesses include influenza, streptococcal infections, pneumococcal infections, and other identifiable respiratory illnesses. The attack rates that I have just given cannot be applied to the population at large, since they relate to a highly selected population of families in the middle and upper economic groups. Other studies, such as those of Spence and his associates in Newcastle upon Tyne[2] and Downes and her associates in Westchester County,[3] have shown differing attack rates depending on the composition of the population and the methods of determining illness. All of them show the relative predominance of the minor respiratory diseases.

Appraisal of this problem, as is so frequently the case in medicine, is ultimately dependent upon a knowledge of etiology and such knowledge is in turn dependent upon technics for isolating and identifying causative agents. Since the process of grouping illnesses together as minor respiratory diseases involves the exclusion of illnesses due to infectious agents already known to cause respiratory disease, the assumption is made that a large proportion, if not all, of the minor respiratory diseases are due to viruses. Until approximately ten years ago the available technics for isolation of viruses from such cases were pretty much limited to the use of embryonated eggs and animals, while in some instances volunteers were used. Approximately ten years ago, however, tissue culture became a practical and widely available technic, due in large part to the use of the antibiotic drugs for the prevention of bacterial contamination of the cultures.

The last decade has been an exciting one for those of us interested in the problem of viral respiratory infections. More than 70 new viruses have been isolated from man during this period; not quite half of them were found principally in the respiratory tract and termed "respiratory tract viruses," and the remainder were from the enteric tract and termed "enteroviruses."[4] While certain of the latter group, the enteroviruses, may occasionally be associated with respiratory disease syndromes—notably the Coxsackie viruses with herpangina and pleurodynia—this group will not be considered further here. Certain of the new "respiratory tract viruses" have been quite clearly identified as the cause of respiratory illnesses; others have been found in association with respiratory illnesses and also in states of apparent normal health, and their causative role has not been clearly established; others appear to persist as latent agents in sites such as the tonsils and adenoids and their role as disease-inciting agents, at least in significant proportions, seems to be minor at the present time. Still others do not seem to be related to any clinical illness and have been referred to as "viruses in search of disease."

The rapidity with which new viruses have been isolated has inevitably led to a state of confusion and to problems of identification and terminology. In fact the present situation in virology might be likened to that which existed in the field of bacteriology during the approximate period from 1890 to 1910 when new strains of bacteria were being identified so rapidly that it was almost impossible to keep up with them. I shall

not attempt to detail the many new strains of viruses isolated and the names that have been given to them, nor to describe the labors of the numerous investigators in this country and abroad who have attempted to bring order out of confusion. Rather I shall present a summary of the groupings thus far arrived at under the headings of the adenoviruses, the parainfluenza viruses of the myxovirus group, and a brief comment on certain other as yet unclassified viruses.

Adenoviruses

In 1938 Stuart-Harris and his associates in Great Britain reported the occurrence of a grippe-like illness which they felt could be distinguished from influenza and which they termed "febrile catarrh."[5] During World War II the Commission on Acute Respiratory Diseases of the Army Epidemiological Board apparently rediscovered this entity as an acute respiratory infection occurring epidemically in recruits.[6] The disease clinically resembled influenza but was not caused by the influenza viruses. Many attempts to transmit the disease or to isolate the agent in animals and in embryonated eggs were unsuccessful. The illness, however, was transmitted to volunteers and it was demonstrated that these men were immune to subsequent challenge at a later date with the same inoculum.[7] This fact confirmed the epidemiological observation that units of recruits who had once experienced an epidemic were subsequently immune. Here the problem rested for a period of about six years. Then in 1953 Rowe and Huebner and their associates[8] reported the isolation of three new viruses from tonsillar and adenoidal tissue removed surgically from children. Preparatory to studies on the common cold these investigators decided to grow pharyngeal tissues in culture, reasoning that such tissues should be suitable for cultivation of the virus of the common cold. They found, however, that after approximately three weeks many of their tissue explants began to show cytopathic change. On passage of the fluid from these tissue cultures to freshly prepared ones, the interval of time between inoculation and the appearance of cytopathic change was reduced to from three to five days. It was determined that the changes were, in actuality, due to viruses which had apparently been latent in the pharyngeal tissues. When the isolation of these three viruses of different antigenic types was reported, their possible relationship to disease was not known. At about this time Hilleman and his associates[9] were investigating an outbreak of respiratory disease in army recruits at Jefferson Barracks. It was determined that some of the illnesses were due to influenza virus A, but that many other cases resembled "acute respiratory disease of recruits" and were not associated with infection with the influenza viruses. From some of these cases a virus was isolated and demonstrated serologically to be related to the infection. This was the first demonstration of the association of an adenovirus and respiratory disease. Retrospective examination of acute and convalescent sera from the patients and volunteers studied during the war by the Commission on Acute Respiratory Diseases showed that many of those cases and also the illnesses in the volunteers were caused by Hilleman's agent.[10] These agents are now grouped together as adenoviruses;[11] Huebner's agents are known as type 1, 2, and 3, and Hilleman's as type 4 adenovirus. Subsequent work by many investigators has amply confirmed the occurrence of infection in man with viruses of this group; 18 specific types have been identified thus far. It is now known that the syndrome of acute respiratory disease of recruits is caused principally by types 4, 7, and 14 and to a lesser extent by type 3. Type 3 virus has been

demonstrated to cause respiratory infections characterized mainly by pharyngitis. Outbreaks due to this type, in which many of the cases have an associated conjunctivitis, have been described principally in summer camps and children's institutions by Bell and his associates.[12] The term pharyngoconjunctival fever has been given to this syndrome. It has also been shown by Jawetz and his co-workers[13] that type 8 adenovirus is one of the principal causes of keratoconjunctivitis.

The role of the adenoviruses in the production of epidemic respiratory disease in recruits—the major disease problem in military mobilization—has been amply demonstrated. The importance of the adenoviruses in the production of disease in civilian life, however, is still uncertain, apart from focal outbreaks as described by Bell and his associates.[12] At the present time there are at least 18 types of adenovirus isolated from human sources and there are probably more not yet identified. Of these, only four or five have been shown to be associated with any appreciable amount of respiratory disease in civilian population groups. The significance of the other types is still undetermined. In all, however, it has been estimated that only 4 to 6 per cent of respiratory infections in civilian life can be attributed to this group of viruses.[14] Vaccines containing types 3, 4, and 7 were found to be highly effective in the prevention of acute respiratory disease in recruits, and the use of such a vaccine will be an important aspect of military mobilization in the future.

Myxoviruses

The myxovirus group, which includes such well known viruses as those of influenza, mumps, and Newcastle disease, has recently been augmented by the addition of three new viruses termed parainfluenza viruses.[15] The first of these was isolated in 1953 by Kuroya and Ishida in Sendai, Japan, from newborns suffering a severe and sometimes fatal type of viral pneumonitis.[16] The parainfluenza-2 virus was isolated in 1955 by Chanock from patients with a respiratory illness diagnosed as croup.[17] The parainfluenza-3 virus was isolated by Chanock and his associates from patients with acute febrile respiratory illnesses in the fall of 1957 by the application of a new technic. Earlier that year Vogel and Shelakov[18] had found that red blood cells added directly to tissue cultures in which influenza viruses were growing would immediately agglutinate and thus demonstrate the presence of virus in the tissues. Chanock and his associates[19] adapted this technic in attempts to isolate agents from children with respiratory disease. These attempts were successful in isolating a new agent initially termed hemadsorption-agglutination virus type 1 and now known as parainfluenza type 3 virus. Another virus isolated by the same technic has been proved to be closely related to if not identical with the parainfluenza-1 or Sendai virus. Confirmation of the isolation of these viruses has now been obtained in various parts of the world, but as yet our information regarding them is too meager to warrant an estimate of the segment of the respiratory illnesses that these agents are capable of inducing. In a study in a children's hospital in Washington, D. C., Chanock, Parrott, and their associates[20] have found the parainfluenza viruses to be associated with approximately 20 per cent of respiratory illnesses having the characteristics of croup, bronchitis, and febrile respiratory illnesses of an ill-defined nature. The importance of them in the population at large has not been defined. It is known that almost all adults have antibodies to the parainfluenza-3 virus, and that by the age of from three to five years nearly all children have acquired antibodies to it.[21]

This must mean that the virus is widespread, but whether infection with the virus produces clinical or, more frequently, subclinical infection has not been determined with certainty. It is of some future importance that the parainfluenza-3 virus is apparently identical with the virus isolated from cattle with shipping fever, a problem of considerable economic importance to the cattle industry.[22] The mechanism of spread of the virus between cattle and man has not been determined.

Other Viruses

There are a number of other viruses isolated from patients with respiratory infections that are, in all probability, capable of inducing minor respiratory illnesses. These include the chimpanzee coryza agent (CCA), initially isolated by Morris and his associates[23] and later shown by Chanock and his colleagues[24] to be present in certain cases of pneumonitis in infants and children. Two additional viruses, the 2060 virus isolated by Pelon and his associates[25] and the JH virus isolated by Price,[26] have been found in association with minor respiratory illnesses of mild severity. These latter two viruses are closely related, if not identical, and it has been demonstrated by Jackson, Dowling and Mogabgab[27] that they are capable of inducing respiratory illnesses in volunteers. The true importance of these agents in the total picture of the minor respiratory diseases has still not been determined.

The possibility of the preparation of a vaccine containing all the known viruses associated with respiratory infections has been suggested in the hope that such a polyvalent vaccine might reduce the incidence of the common respiratory diseases. To me, such a proposal is neither scientific nor ethical. Before any virus associated with respiratory illnesses is incorporated in a vaccine for general use in our population, it should be clearly demonstrated that: the virus causes the disease in question, the disease is followed by immunity, the virus can be grown in sufficient quantity to prepare a vaccine effective in the stimulation of antibody, there is a positive correlation between the presence of antibodies and resistance to infection, and finally, the incidence of illness caused by the virus is sufficiently great to warrant attempts to immunize on a mass or a broad scale. At the present time these criteria can be met only in the case of the adenoviruses producing acute respiratory disease in military populations. There is no apparent justification for the use of even adenovirus vaccine on a mass scale in civilian populations at the present time.

In conclusion, I hope it is apparent that our knowledge of the problem of minor respiratory diseases and their causative agents has been expanding very rapidly. While there is still much confusion and ignorance there is emerging at least some semblance of order. It should be emphasized, however, that so far as we now know all these agents account for a relatively small proportion of the total minor respiratory infections. None of the viruses have been shown to be associated with the ordinary common cold which is still, in terms of occurrence, the biggest problem in this field; but that is not the most important aspect of the present status of the problem. The most important aspect is that we have experienced another breakthrough which has expanded our knowledge considerably and will continue to do so in the future. Perhaps the solution of the problem of the common cold will have to await yet another new technological development; we can be sure that it will come.

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The public health worker is action-oriented. He wants to apply knowledge in the form of organized programs involving many people. Yet more and more he realizes that obtaining the participation of these individuals is often not simple or easy, and can be extremely frustrating. How can they be motivated to take necessary action? This paper indicates what has been found by some social scientists.

WHAT RESEARCH IN MOTIVATION SUGGESTS FOR PUBLIC HEALTH

Irwin M. Rosenstock, Ph.D., F.A.P.H.A.

THE PENDULUM of professional opinion swings first this way and then that, making fashionable today what was unfashionable, even unknown, yesterday. The time when the social or behavioral sciences were not part of the culture of public health is well within the memory of everyone now working in the field. In those days behavioral scientists, in self-defense, were required to proclaim long and loud that they had much to contribute to public health programs. The pendulum has now swung the other way. In many circles behavioral science is now fully recognized as an important adjunct to programs. In some circles behavioral science is regarded almost in the role of savior. From Pariah to Messiah in ten years. Public health may be suffering from a new disease called "behavioral scientitis." The epidemiology of this condition needs more study. In these circumstances it is necessary to proclaim that while behavioral science does indeed have a needed contribution to make to public health practice, it takes its place alongside the contributions of other disciplines. Behavioral science is neither Pariah nor Messiah.

Before proceeding, a brief word should be said in anticipation of an almost inevitable question. Since the advent of Motivation Research, public health workers have been asking whether our large corporations and advertising concerns have already solved the kinds of problems facing us in public health. Has the advertiser learned so much about motivation that he has been enabled thereby to induce large portions of the American public to buy products that they would not buy if Motivation Research had not been done? Without taking the time to consider this question fully, a brief analysis of the goals and methods of the advertiser will show that he rarely needs to reach a large proportion of the public. It will also show that he is frequently dealing with a population ready to act without his urging.

Consider briefly, the goals of commercial enterprise. Even the most far-flung industrial giant rarely needs to capture more than 50 per cent of its

potential market to show huge profits; often 1 per cent will do nicely. Health workers, on the other hand, know that for the control of certain diseases, such as smallpox, about 70 per cent of the market must be obtained; to control polio 100 per cent of the market should be captured. In the chronic diseases and in mental disorders equally large proportions of people must be reached to assure effective control. Thus, in public health, goals are necessarily set higher than in commercial enterprise.

Now, it is important to note that advertisers frequently deal with a motive that people are known to have such as a desire for food or transportation. In this situation the main requirement for selling is for the advertiser to provide some incentive or appeal for acquiring his product rather than his competitor's. Frequently used incentives include free samples, colorful packages, and the like. The health agency, on the other hand, more frequently deals with clients who may not be motivated, especially when they are not currently suffering from some illness; and the task here may involve teaching new motives, a task which is much more difficult than that of selecting an appropriate incentive or appeal.

Consider the kinds of action consumers are urged to take in the two fields. The advertiser normally has it within his power to make the act of purchasing a product simple, convenient, and pleasurable; he may even offer prizes or free samples. The health worker, on the other hand, is faced with the more difficult task of asking people to submit to procedures that are often inconvenient, painful, expensive, time consuming, and difficult to perform.

One additional point may be made. It is rarely possible to test the validity of a particular motivational finding in the commercial world, because the introduction of a new campaign appeal by an advertiser is usually accompanied by changes in other parts of the campaign as well. Thus, he may advertise much more intensively; he may employ new media; he may change his package design; and he may offer prizes. Since all these important aspects of the campaign are variables, it is not possible to attribute an increased volume of sales to any particular one.

This too brief discussion of Motivation Research may be concluded with the observation that in view of the past successes of public health in the difficult job of controlling disease, we may have more to teach commercial researchers than we can learn from them.

Principles of Motivation

Returning to the main theme, we may now ask what behavioral science is and what it has contributed to public health. The facts and principles that make up the core of behavioral science, are to a large extent, in the area of the determinants of behavior. Before attempting to apply principles of motivation to public health, let us consider why we are interested in the topic. It is likely that the basic reason for motivation study, whether it takes place in the university laboratory or in the health community, is due to a concern with behavior and the belief that all behavior is motivated. Since we believe that all behavior is motivated, we may expect to understand, predict, and control man's behavior to the extent that we can adequately identify his motivations.

In the health area, motive has been used both in the positive sense of the individual's desires to have or to attain certain things, or on the other hand, it has been thought of in a negative sense as unpleasant or undesirable things to be avoided. There is not the time here to discuss in detail the problem whether health is something sought after positively, or whether the true motive is simply avoidance of disease. Suffice it

to say that there are adequate data available to demonstrate that in many, many situations health motives have the characteristics of threatening events to be avoided or barriers to be overcome. Accordingly, health motive will be used here exclusively in the sense of subjective threats which tend to force the individual to take action to avoid or ameliorate their effects.

Behavioral science has come to see that the widely accepted formula, all behavior is motivated, is not sufficient to account for a specific act of health behavior. The missing element may be derived from the work of Kurt Lewin.[1] Behavior may thus be regarded as a function of a person's motive and of his beliefs about various opportunities for action. This formula has been spelled out by behavioral scientists in the Public Health Service as the first principle of motivation to account for health behavior. This principle states that health behavior is a function of a health motive or threat and the individual's beliefs about various courses of action open to him. Let us consider in detail the two variables—first, health motive or threat and second, the individual's beliefs.

There is reason to believe that two principal dimensions define whether a health event will become subjectively motivating or threatening. They include: first, the degree to which the individual believes that he is susceptible to a given health problem or disease and second, the extent to which he believes that contracting such a disease or problem would have serious consequences for him. The person who fails to believe that he is likely to contract a given illness or that the illness is serious will not be motivated to take action regarding it; he must believe both. In this area of beliefs concerning susceptibility and severity the emphasis is on the person's beliefs and not on objective reality. It is well known that people vary markedly in their interpretations of so-called objective reality. Moreover, the term "severity" or "seriousness" of illness as used here includes more than the clinical or medical severity of the illness. It may, and often does, include beliefs about consequences in areas such as family relationships, finances, and occupation. Thus, for example, an individual might regard tuberculosis as a disease which is no longer clinically serious but as having profound implications on his family, his finances, his career, and his social relationships.

In summary, then, the motive that determines whether health-related actions will be taken depends upon the degree to which the individual feels threatened by a given disease, where the threat is defined as including both the degree of perceived susceptibility to the condition and the perceived seriousness of that condition should it occur.

In addition to the role of health motive or threat, Principle I states that a certain set of beliefs is required before action of a given kind will take place. In order for an individual to take some given course of action relative to a real or potential health problem, he must not only feel threatened by the health problem, but he must also see one or more courses of action open to him which he believes would either reduce the likelihood of occurrence or the seriousness of the problem. For example, in the area of tuberculosis detection, a motivated individual will not take action to detect tuberculosis unless he believes first, that there are valid means of detecting it, and second, that its detection would, in the long run, reduce the seriousness of the disease for him. Again, the emphasis is on the individual's beliefs and not on what is objectively true.

The theoretical discussion derives in part from a recent monograph by Godfrey Hochbaum on a study in tuberculosis detection[2] and also in part from

a paper by Nancy Starbuck Meltzer on reasons for community acceptance or rejection of programs for the topical application of sodium fluoride.[3] A more comprehensive statement will appear in a forthcoming paper reporting a study of the impact of the influenza epidemic of 1957-1958 on samples of the general public.[4]

In summary, motivation Principle I states that health behavior is determined by the degree to which a person sees a health problem as threatening, having both serious consequences and a high probability of occurrence in his case; and by the extent to which the motivated individual believes that some one of several courses of action open to him will be effective in reducing the threat.

A second principle of motivation is that the individual's motives and beliefs about various courses of action are often in conflict with each other and that behavior emerges as the resolution of such conflicts. Three kinds of conflicts may be described: (1) two motives may compete with each other for dominance; (2) an available course of action to satisfy a motive may be intrinsically frustrating; and (3) the individual may not see any course of action to satisfy an existing motive. Let us consider the three kinds of conflict.

1. When two motives both demand satisfaction, e.g., economic motives and motives related to health, the one having the highest importance for the individual will ordinarily become dominant. Existing data based on limited observations suggest that the set of health motives taken as a whole are perhaps less potent or salient for most people than other kinds, such as motives concerning social approval. As a consequence health-related motives may be superseded by others where the two have a potential for being aroused at the same time.[5] Several observers have made unpublished observations that following times of natural disaster, the affected population is less likely to call on physicians for routine illnesses than in normal times. This principle of the conflict of motives may be helpful in explaining why lower socioeconomic groups do not appear to be highly motivated in the health area. It may well be that in such groups motives for food, shelter, and clothing override motives for health.

2. Now, even when a person is motivated relative to his health, a conflict may occur to influence ultimate behavior if the action he is required to take is in itself unpleasant, painful, or upsetting. Even if he sees a course of action as potentially effective in reducing the threat, he may not take it if it conflicts with more powerful internal forces.

3. In still another and important type of conflict, the individual fails to accept the health workers' beliefs that effective means do in fact exist to prevent or ameliorate specific conditions and is unable to see any action as being effective. In this case as well as in the case in which an effective action is seen as creating great problems for him, existing experimental evidence suggests that one of two reactions may occur. First, the individual may attempt to remove himself psychologically from the conflict situation by engaging in activities not satisfying his motive but symbolically related to it.[6] Perhaps some of those who have not found a more direct means of satisfying their particular health motives concentrate on giving volunteer service in a health organization. Still further removed from the original unsolvable health problem but nevertheless motivated by it may be an increasing reliance on mysticism and magic.

A second major consequence of the absence of satisfactory means for solving an important health threat is marked increase in fear or anxiety.[6] If the anxiety or fear becomes strong enough, as it will in some cases, the individual

may arrive at a state in which he can no longer think objectively and behave rationally about the problem; in fact, he may even deny that it is important to him. Even if such an individual is subsequently offered a more effective means of handling the problem, he may not accept it simply because he can no longer think constructively about the problem. Therefore one must think very carefully before willfully arousing motives for health action.

A third and final principle of motivation to be considered here concerns a frequently observed characteristic of motivated behavior. The principle may be stated in the following way: Health-related motives may sometimes lead to behavior unrelated to health, and conversely some behavior which has the appearance of being health-related may in fact be determined by motives unrelated to health. The first part of the principle was considered in the discussion on substitute actions in conflict situations. The converse, however, has equally great significance, for the fact that health behavior may occur even where health-related motivations do not exist offers the health worker an opportunity for action. For example, we know that of any group of people voluntarily participating in a health screening program, some proportion will have come for reasons unrelated to health,[2] perhaps on the basis of the social pressure of relatives and friends, perhaps out of encouragement by employers and supervisors. Undoubtedly other health actions may be determined by social motives or by other nonhealth motives. The three major principles discussed may be summarized briefly:

Principle I—Preventive or therapeutic behavior relative to a given health problem in the individual is determined by the extent to which he sees the problem as having both serious consequences and a high probability of occurrence in his case and the extent to which he believes that some course of action open to him will be effective in reducing the threat.

Principle II—Behavior emerges out of frequent conflict among motives and among courses of action. Where motives themselves conflict and compete for attention, those which have the highest value or salience for the individual will actually be aroused. Health matters—at least in the individual who believes himself healthy—are probably not as potent as are certain other motives, especially economic and social ones. Where the conflict is based on the individual's belief that no available course of action will be effective or where a prescribed course of action is believed to create equally or more serious problems of other kinds, the conflict may be resolved in a variety of maladaptive ways.

Principle III—Health-related motives may not always give rise to health-related behavior, and conversely health-related behavior may not always be determined by health-related motives.

Implications

The first implication of the three principles for public health work is that long-range attempts to influence the behavior of the consumer in a planned fashion must be based on better knowledge of the nature and organization of his motives and on better knowledge of his beliefs about various action possibilities open to him. In short, successful public health programs must be based on adequate social research. This implication must not be interpreted as suggesting that programs must wait for adequate research; indeed, quite the contrary is true. The public health worker is the clinician for his community just as the practicing physician is the clinician for his patient. The practice of medicine or of public health imposes an obligation to provide the

best care possible using the facts at hand. In this tradition, public health workers must frequently estimate the motives and beliefs of their clients.

Nevertheless, we would be poor clinicians indeed if we did not welcome opportunities for obtaining better data on which to base the programs of the future. And so, the requirement for increased and sound social research in health is not an alternative to current practice but a guide to the future.

A second implication of research in motivation is that much can be done today without major program change to increase public participation in health programs and practices. It is undoubtedly true that some of the failures of individuals to take recommended action are based not on difficulties in motivation, but rather on fairly simple gaps in information, or on misinformation about effective courses of action. The situation relative to polio vaccination is perhaps a good example. Some of the people who now avoid vaccination believing that vaccination is dangerous or ineffective would be helped by accurate information. How such information may best be provided is a question for the professionals. Certainly, it is not simple to accomplish; we realize that people may know a good many things about detection and cure of diseases and still fail to accept this knowledge as applicable to themselves. In spite of this, wherever one finds that the barrier to effective health action lies in the individual's belief about the utility of taking such action, one has an area more amenable to change than that of motives.

An analysis of the motivational principles reported poses as a third and final implication a question of enormous importance for the future of public health. In the most clear-cut down-to-earth terms, the question is: Will programs be adapted to fit people or will people be adapted to fit programs? In more complete terms: Should public health programs be oriented to fit within people's existing motives and beliefs, or should attempts be made to change people's motives and beliefs in accordance with professional estimate of what changes are needed? The implications of either choice are profound.

If the decision were reached to reorient programs in terms of existing needs and beliefs it would entail radical reorganization of program and administration. Suppose it can be shown that health-related motives, especially those regarding prevention, are weak in comparison with such other motives as the social, the parental, the sexual, the economic? Would we not then be well advised to tap some of these motives in attempting to persuade people to take health action? Might we, for example, attempt to stimulate health behavior as a means of obtaining social approval, of satisfying one's needs to be a good parent, or satisfying social standards of behavior on the job?

Suppose it is further shown that even within the set of existing health motives those related to prevention are almost insignificant compared to those related to therapy. Would we not then be well advised to emphasize care rather than prevention in our appeals to the public—even when our program focus is prevention? Would we not be well advised to administer our programs, even our preventive programs, through institutions identified by people as providing therapeutic services, mainly the hospital and the private physician? What would be the logic in such a case of setting up a building specifically designed not to provide treatment? Would we not in addition to the foregoing find the need for tremendous variation among local programs based on differences in motives and beliefs in different groups? There is no need to spell out all the implications of an approach calculated to reorient public health in terms of

existing motives and beliefs of people. The few questions posed should suggest others.

The alternative answer to the question—that of attempting to change motives and beliefs—has equally profound significance, though of a different kind. How are motives willfully taught? How are value systems changed? How can we teach motives around accident prevention, for example, to teenagers and even adults who are now highly motivated to take risks? These are people who receive social rewards for driving fast, who ridicule others for using seat belts, who compliment a neighbor who takes risks on a shaky ladder when he is installing storm windows. How can we teach motives for rest or relaxation to people, including health workers, when the culture now rewards those who work night and day? How many of us can fail to admire our co-workers and supervisors who pridefully inform us that they complete even more office work at home than the phenomenal amount they accomplish in the office?

Any attempt to increase the value for health may first entail decreasing the value of other dimensions of life. And that will be no mean job, since methods for introducing planned cultural change into a complex society have not yet been developed. Whatever the methods used they would surely involve introducing education for health at many age levels starting with the earliest years of life. It would probably have to be introduced in terms of and through most of our existing institutions—our religious, economic, educational, and social institutions—as well as our complex national communications network. Surely the teaching of new health motives to the public would be a gigantic undertaking. Furthermore, the question being discussed raises a number of ethical issues which require resolution. It seems likely that public health will attempt both alternatives. We will try to adapt our programs to people's current motives but at the same time we will be engaged in efforts to educate for new motives. How can behavioral science contribute to both objectives? Two kinds of contributions may be anticipated:

1. Our success in adapting programs to people will be in direct proportion to our knowledge of people. Therefore, continued improvement of theories of behavior will lead to researches that are progressively more complete in illuminating those motives and beliefs of people which determine their health behavior. Behavioral science has the obligation not only to develop such knowledge but to communicate it effectively to the public health worker.

2. Before education to strengthen health values and motives can be effective, methodological research will be needed to throw more light on the processes by which motives can be experimentally changed and by which cultural values are changed. This is another area in which behavioral science can assist.

Finally, it is important to remember that ultimately these contributions can be effective only if they are incorporated into health programs based on an adequate knowledge of prevention and control of disease; programs accepted and integrated into the community; programs administered and operated by dedicated and thoughtful people. In short, the contribution of behavioral science to public health action can only be effective as it takes its place with other disciplines in making the maximum contribution to the total program.

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Psalm for Salk

For the vaccine which safeguards mankind may the Lord be praised all days.
For the scientific materials beneath the earth may the Lord be praised all days.
For the chemicals discovered in the air may the Lord be praised all days.
For the magnified eye which enlightens the mind may the Lord be praised all days.
Yea, for the serum which protects the body as grace does the soul may the Lord be exalted forever.
For the relief of the innocent's pain may the Lord be praised all days.
For the perseverance in its research may the Lord be praised all days.
For man's determination unto the end may the Lord be praised all days.
For the contribution of a great man may the Lord be praised all days.
Yea, that little children may walk unto Him may the Lord be exalted forever.

(Wesley Ann Pribyl, Redwood City, California: age 14.)

(Editor's note: Printed with permission. Alcor S. Browne, Ph.D., chief, Microbiology Laboratory, California State Department of Health, brought this poem to the attention of the editors in the belief that Journal readers would appreciate this young lady's thoughts, as she expressed them in one of her science courses.)

The following paper describes a method for estimating the incidence rate of a disease in a recent period in a population exposed to an antecedent factor as compared with the rate in their family relatives. This family control method is applied to a specific case.

COMPARISON OF A GROUP WITH A DISEASE AND A CONTROL GROUP FROM THE SAME FAMILIES, IN THE SEARCH FOR POSSIBLE ETIOLOGIC FACTORS

Arthur S. Kraus, Sc.D.

IN THE SEARCH for the etiologic factors of a disease, the relative frequency of various antecedent factors among persons with the disease is often compared to the frequency in a "control" group of individuals without it. (The antecedent factors under study in a particular investigation will be referred to as "factor O" in this paper, and the disease under study will be called "disease X"). The purpose of the control sample is to provide a standard of comparison against which the findings for the sample of persons with disease X can be judged. While any group of individuals without the disease might be used as a basis for comparison, it is often considered desirable for the control group to reflect the "normal" or general population. In practice, a variety of types of control groups are used. These include samples drawn from individuals with other diseases available at the same medical facilities which supplied the sample of persons with disease X, from personnel at these facilities, from the families or contacts of the persons with disease X, from the general population, and from other sources.

The control group is often matched to the diseased group by age, sex, or other characteristics which might be associated with both the factor and the disease under study. The rationale is that if the frequency of factor O is then found to be different in the diseased group than in the control group, the difference should be independent of the "disturbing effect" of the association between factor O and the characteristic used in matching.

One plausible and frequently mentioned "disturbing effect" is that some unknown subgroup or subgroups within the population which have a high frequency of factor O might happen to possess other characteristics which play an etiologic role in the disease, while factor O has no etiologic significance. (This type of association between factor O and disease X will be called a "group correlation" mechanism in this paper.) Theoretically, a method of eliminating this hypothesis as a possible explanation of observed results might be to match

each person with the disease to a control who came from the same subgroup of the population with respect to all group characteristics. This probably is not possible in practice. However, the goal might be approached by selecting individuals from the families of the diseased persons as controls, since members of the same family would usually be from the same subgroups of the population regarding many important variables.

The writer is aware of four published reports[1-4] in which a group with a disease was compared with a family control group, with respect to some antecedent factor. The method of analysis in these papers was to calculate the proportion of "cases" and of controls with factor O, and to use the difference between these proportions as the criterion of the association of factor O with the diseased group. This would be the usual way of comparing two independent groups. However, since the controls came from the families of the cases, the two groups were correlated, rather than independent. McNemar[5] and Mosteller[6] have shown that analysis of the difference between two correlated groups by this method may result in "false-negative" conclusions. They propose a more sensitive method, which will be utilized in this investigation.

This study will attempt to show that one step can be added to the method proposed by McNemar and Mosteller to answer an important question which was not considered by these authors. This question is: How can the comparison of cases of disease X and their family controls with respect to factor O be used to estimate the ratio of (1) the incidence rate of disease X in the population of individuals with factor O, to (2) the rate in their family members without factor O? The method developed will be applied to an epidemiological investigation of current interest to illustrate its use.

Estimating the Incidence Rate of a Disease in Individuals with an Antecedent Factor Relative to the Rate in Their Family Members Without the Factor

Hypothetical Illustration

A hypothetical subpopulation within a total population will be assumed here. It consists of those husband-wife pairs in a given geographic area with neither spouse having a prior history of disease X at the beginning of period T. The incidence rate of the disease during period T is assumed to equal "P" among individuals without factor O (these will be designated by the symbol ϕ), and to equal "kP" among individuals with factor O, regardless of sex. The factor "k" is therefore the factor to be determined. Assuming no losses during period T, the incidence of the disease in the subpopulation would be as shown in Table 1A.

Let us assume that all new cases of the disease in the total population diagnosed during period T in the area of the study can be identified. From these, let us select the cases that had spouses with no prior history of the disease at the beginning of period T. The selected cases would include all of the new cases shown in Table 1A. The tabulation of each of these case-spouse pairs according to the presence or absence of factor O in each individual of the pair is shown in Table 1B.

As seen in Table 1B, the ratio of (1) the number of total pairs in which the case has factor O and the spouse control does not, to (2) the number of pairs in which the case lacks O but the spouse has it is equal to $NkP(b+c)/NP(b+c)$, which equals "k." (The ratio of the two frequencies just described will henceforth be called the "ratio in the positive diagonal.") Thus, the relative incidence factor under study can be determined by finding the ratio in the positive diagonal of the tabulation of all eligible case-spouse pairs.

Several features of the method are discussed below.

(A) The procedure used for tabulating the new cases of disease X and their spouses is the same as that discussed by McNemar[5] and Mosteller[6] in connection with the general problem of analyzing the difference between any two correlated samples. The significance test they propose consists of determining the chance probability of obtaining "w" or more successes out of "w + y" binominal trials; ("w" is the frequency in the upper cell and "y" is the frequency in the lower cell of the positive diagonal). The additional feature here is that when the two correlated groups consist of cases of a disease and their spouses, w/y is found to equal the relative incidence factor under study.

(B) It may be either unnecessary or economically impossible to investigate all of the new cases of disease X. If a random sample of eligible case-spouse pairs is studied, the sample ratio in the positive diagonal is a biased estimate of the ratio for all eligible case-spouse pairs. As is well known, however, the bias decreases with increasing sample size (Sukhatme[7]). Fortunately, for moderate-sized samples involving at least twenty pairs in the positive diagonal the bias may be regarded as negligible.

It may sometimes be difficult to obtain even a random sample of newly diagnosed cases of a disease. A highly selective sample, such as from one hospital, might result in a poor estimate of the relationship between factor O and the disease in the whole subpopulation under study. It would seem desirable to utilize all or a random sample of source facilities of an appropriate type in obtaining the sample of cases. For example, with a disease likely to involve hospitalization at or soon after diagnosis, such as stomach cancer, a reasonably good sample might be obtained from the total hospitals of the area. For a disease like arthritis, which is unlikely to involve early hospitalization, a random sample of the appropriate type of physician in the area might be required as a source for the sample of new cases. For accidental injuries it may be relatively easy to sample the more severe cases who are hospitalized, but difficult to sample the milder cases treated at home or in a physican's office. Furthermore, new cases who died before they could participate in the study may have to be omitted if the information needed about factor O can only be obtained from living subjects. In general, a reasonable approach may be to obtain a random sample of the new cases whose degree

Table 1A—Incidence of Disease X in Hypothetical Subpopulation Number 1

Type of Spouse Pair	No. of Pairs at Beginning of Period T*	New Cases of Disease X in Period T	
		Male	Female
Husband and wife both have factor O	aN	aNkP	aNkP
Husband O, wife ϕ	bN	bNkP	bNP
Husband ϕ, wife O	cN	cNP	cNkP
Both ϕ	dN	dNP	dNP
Total	N	NP(ak + bk + c + d)	NP(ak + b + ck + d)

* a, b, c, and d are each proportions, with a + b + c + d equal to 1.

Table 1B—Tabulation of Case-Spouse Pairs from Table 1A, According to Factor O

Type of Case		Number of Pairs by Type of Spouse Control	
		O	ϕ
Male:	O	aNkP	bNkP
	ϕ	cNP	dNP
Female:	O	aNkP	cNkP
	ϕ	bNP	dNP
Both Sexes:	O	2aNkP	NkP(b+c)
	ϕ	NP(b+c)	2dNP

of severity makes them available from readily utilized sources, such as hospitals. The results could then be generalized only to the type of case sampled. However, if little is known about the etiology of a disease, it would seem desirable to investigate the etiology of available cases within a given range of severity, rather than to refrain from a study because a random sample of all cases could not be obtained.

(C) Spouses of new cases are eligible for the control group if they had no prior history of disease X at the beginning of period T. If they happened to develop the disease during the period, they are still eligible.

Adjustment of the Influence of Age and Sex

When factor O and disease X are both significantly associated with age, which is usually the case, family controls could be selected that are in a comparable age group to their paired diseased individuals. Spouses, siblings, and siblings-in-law would probably be the most eligible family controls from this standpoint. If factor O and disease X are also both associated with sex, matching family controls, namely, sibs or sibs-in-law of the same sex as the diseased individual, might be desirable. However, these might not be available for a high proportion of the group with the disease. Spouses may be the only sufficiently available type of family controls. If spouses are used, an adjustment for the influence of sex can often be made, as described below.

To adjust for the influence of sex, case-spouse pairs for cases of each sex should be tabulated separately. The adjusted estimate of the relative incidence factor under study equals the square root of the product of the ratios in the two positive diagonals. If this adjusted estimate of the relative incidence factor under study is to have some stability, a reasonable number of case-spouse pairs in the positive diagonal for cases of each sex is required. It would therefore not be desirable to use spouse controls when studying a disease which occurs only or predominantly in one sex, if sex is significantly associated with factor O.

Choice Between Different Types of Family Relatives as Controls

As indicated above, spouses, sibs, and siblings-in-law would be desirable controls, when factor O is associated with age. When factor O is also associated with sex, a sex-adjusted result can be obtained with any of these controls, if there are a sufficient number of new cases of the disease of each sex available for study. If the disease also occurs predominantly in one sex, family controls should not be used, unless a sufficient number of sibs or siblings-in-law of the same sex as the cases are available as controls.

A type of family control should be selected which is available for a comparatively high proportion of cases of disease X. However, a particular type of relative would not be useful as a control if it was always or almost always equal to its paired case with respect to the antecedent factor. This is because only those pairs in which the two members differ contribute to the estimate of the relative incidence factor under

study. For example, sibs would not be useful as a control if a history of the disease among blood relatives were the antecedent factor.

When sibs are used as controls, either the available sib nearest in age to the paired case or all available sibs could be included. However, if all available sibs were used, it would be difficult to determine the number of independent case-control pairs when performing a test of statistical significance.

Application of the Family Control Method in an Actual Investigation

In this section, the family control method will be applied to data from the Donora Health Survey,[8] to illustrate its use.

The Donora Health Survey

A heavy smog settled over the area surrounding Donora, Pa., for four days in October, 1948, causing an immediate and marked increase in illness in the population. Seventeen deaths occurred in the area on the third and fourth days of the smog, compared to an expected number of less than one death for the same length of time. The youngest of these deaths was 52 years old, and 12 had a history of chronically diseased cardiorespiratory systems.

One of the phases of the USPHS study[9] which began soon after the smog episode was a survey of randomly selected households in Donora Borough. One of the questions covered was how each individual in the household had been affected by the smog. Detailed information was obtained on type and duration of symptoms and medical care received, which was used to classify each individual as "not affected," "mildly affected," "moderately affected," or "severely affected." Among the other subjects covered at the interview was the presence or absence of specified chronic conditions prior to the smog.

The Donora Health Survey was conducted in 1957. The principal objective was to contrast the subsequent health history of the group reported in the USPHS survey to have been "affected" by the 1948 smog with the group reported as "not affected." Morbidity data were obtained for 92 per cent of the USPHS survey sample and survivorship and mortality data for 99 per cent, from personal interviews, mail questionnaires among those who had moved, follow-up through the post office, and death records.

The Donora Health Survey found in general that those who were reported as affected by the 1948 smog have had a substantially worse subsequent morbidity and mortality experience than the not-affected group. The specific relationship observed which will be explored further here with the family control method is that among those with no reported prior heart disease, asthma, and chronic bronchitis, those reported as affected by the smog have had a higher subsequent incidence rate of reported heart disease of specified types than those reported as not affected.

Data on this relationship appear in Table 2, based on somewhat different definitions and classifications than were used in the survey. The groups "not affected" and "mildly affected" by smog are combined in Table 2 into a group called "essentially unaffected." This group is contrasted with a group called "substantially affected," which includes the "moderately affected" and "severely affected" groups. The 112 individuals with "new heart disease of specified types" include 86 deaths and 26 persons still alive in April, 1957.

Table 2 shows that the reported incidence rate of the specified types of heart disease, since the smog, was higher in the substantially affected than in the essentially unaffected. This was true for each of five specific age groups in males, and for four of the five age

Table 2—The Relationship Between Reported Smog Affection and Subsequent Reported Incidence of Specified Types of Heart Disease in Donora, Pa.

	Males						Females					
	Essentially Unaffected			Substantially Affected			Essentially Unaffected			Substantially Affected		
		New Heart Disease of Specified Types†			New Heart Disease of Specified Types†			New Heart Disease of Specified Types†			New Heart Disease of Specified Types†	
Age	Total*	No.	Incidence Rate (%)	Total*	No.	Incidence Rate (%)	Total*	No.	Incidence Rate (%)	Total*	No.	Incidence Rate (%)
Total (15 and over)	945	27	2.9	516	38	7.4	977	23	2.4	419	24	5.7
15–34	468	3	0.6	148	1	0.7	516	1	0.2	148	0	0.0
35–44	160	1	0.6	97	2	2.1	167	1	0.6	71	2	2.8
45–54	133	2	1.5	108	6	5.6	138	4	2.9	79	3	3.8
55–64	118	12	10.2	112	16	14.3	99	6	6.1	74	9	12.2
65+	66	9	13.6	51	13	25.5	57	11	19.3	47	10	21.3

* Total in USPHS survey conducted in 1948 after the smog episode, with no reported heart disease, asthma, or chronic bronchitis prior to the smog.

† Among those included in the "Total" column, deaths between the USPHS survey and April, 1957, from arteriosclerotic and degenerative heart disease and "other diseases of the heart" (International list No. 420–434), plus live individuals reporting medically diagnosed heart disease in the 1957 survey which was not specified as rheumatic and was without high blood pressure also indicated as a condition or symptom.

groups in females; the exception in the youngest females was trivial. Using the age and sex distribution of both affection groups combined as a standard, the age-sex-adjusted incidence rate in both sexes combined is 3.09 per cent for the essentially unaffected and 5.00 per cent for the substantially affected. The ratio of these rates is 1.62. There is some question about the applicability of a conventional significance test in this situation. However, if the conventional test of the difference between these two percentages is performed, $P<0.02$. Since date of first medical diagnosis has not been determined for the deaths, who constituted most of the new cases, it is not possible with the data at hand to comment more precisely on the period of high reported incidence in the substantially affected group.

Comparison of Reported Heart Disease Cases and Family Controls

It can be seen in Table 2 that in each sex the proportion of total persons who were substantially affected increased considerably with increasing age; also, the proportion was somewhat higher in males than in females. To utilize the data already collected by the Donora Health Survey the choice of control was restricted to family relatives living in the households of the cases. It was decided in this investigation to use spouses of the cases as controls and to adjust the results for sex. Sixty-three reported cases of "new heart disease of specified types" had a living spouse residing in the same household during the 1948 smog who was reported free of prior heart disease, asthma, and chronic bronchitis.

The tabulation of the 40 pairs involving a male case and his wife, with respect to smog affection, is shown in Table 3A. The ratio in the positive diagonal equals 12/1, or 12.0. This ratio is influenced not only by the risk associated with smog affection and by chance, but also by the sex difference and an average age difference of five years between the cases and controls.

The tabulation of the 23 pairs involving a female case and her husband is

Table 3A—Tabulation of 40 Pairs Involving Male Cases of Reported Heart Disease and Their Wives, According to Smog Affection

	Controls (Wives of Cases)		
Male Cases	Substantially Affected	Essentially Unaffected	Total
Substantially affected	15	12	27
Essentially unaffected	1	12	13
Total	16	24	40

shown in Table 3B. The ratio in the positive diagonal equals 3/3, or 1.0. This ratio is influenced by a sex and age difference between cases and controls opposite in direction to the difference in Table 3A. For the total 63 pairs in Tables 3A and 3B, the ratio in the positive diagonal equals 15/4, or 3.75. This ratio is still somewhat influenced by the greater number of male cases than of female cases.

The age-sex-adjusted ratio in the positive diagonal for cases of both sexes combined equals $\sqrt{(12.0)(1.0)}$, or 3.5. While a larger number of pairs in the positive diagonals would have been desirable, the result with the 19 available pairs was statistically significant, with $P<0.02$.

As previously described, the relative incidence rate of reported heart disease of the specified types in all substantially affected individuals versus essentially unaffected individuals in Donora was 1.62, independent of age and sex. One of the plausible hypotheses that could explain this observed association would be a "group correlation" mechanism, involving racial, national, or socioeconomic groups, groups living in certain neighborhoods or types of houses, or other groups. However, the relative incidence rate in substantially affected individuals versus their essentially unaffected spouses has been estimated to be 3.5, independent of age and sex. This latter association can not be explained by a "group correlation" hypothesis involving any type of group which would contain both members of a spouseship if it contained either member.

The observed association in the whole Donora population was not as strong as the estimated association within spouseships, although the difference was not statistically significant, ($P>0.15$). It therefore appears that the association observed in the total Donora population was not the result of a "group correlation" mechanism. If any such mechanism was in operation in that population, it seems to have been one which reduced the observed association between smog affection and subsequently reported heart disease in that population.

It is interesting to speculate on the most likely explanation of the observed results. While the findings of an investigation using family controls may eliminate the "group correlation" hypothesis, an etiological hypothesis is not the only alternative. What might be called "individual correlation" hypotheses also remain as possibilities, since the controls are other individuals than the cases, even though they are in the same subgroup of the population. For example, let us assume for the purpose of dis-

Table 3B—Tabulation of 23 Pairs Involving Female Cases of Reported Heart Disease and Their Husbands, According to Smog Affection

	Controls (Husbands of Cases)		
Female Cases	Substantially Affected	Essentially Unaffected	Total
Substantially affected	11	3	14
Essentially unaffected	3	6	9
Total	14	9	23

cussion that the observed association represents a real association between smog affection and the later existence of certain diagnosable disease entities. (This assumption may not be justified, since reports by survey subjects regarding the presence or absence of heart disease prior to the smog and since the smog were not verified by medical examination, and reported causes of death were accepted without further verification.) The etiologic hypothesis would be that substantial affection by smog played a role in the pathological process which reached the state of diagnosable heart disease during the next eight years in some individuals who would not otherwise have reached that state during that period. The most plausible "individual correlation" hypothesis apparent to the writer would be that individuals whose subclinical pathological state at the time of the smog would normally have tended to progress to diagnosable heart disease during the next eight years were identified by an adverse reaction to the smog. Putting this hypothesis another way, the smog served primarily as a diagnostic screening test rather than as an etiologic agent for subsequently diagnosed heart disease.

In the opinion of the writer, certain facts support the latter "screening test" hypothesis. The rate of substantial affection increased with increasing age. The Donora Health Survey showed that at any age level the rate of substantial affection was markedly higher among those with reported heart disease prior to the smog than among those reported free of the disease. This picture suggests that, in general, substantial affection occurred among those with pre-existing known or subclinical pathology. It does seem likely that the smog precipitated the excessive number of deaths which occurred during the episode, in the sense that it provided an unendurable stress to certain individuals already seriously incapacitated by disease. However, the survey reports that neither the total mortality rate nor the mortality rate from the specified types of heart disease appears elevated in the total Donora population in the years since the smog. Smog affection thus seems to have played more of a diagnostic role than an etiologic role in cases of heart disease of the specified types reported since the smog.

Discussion

Some of the limitations and advantages of the family control method that has been described are listed below.

There are some circumstances under which it would be impossible or inadvisable to use the family control method in the study of the relationship between disease X and antecedent factor O. These include: (a) factor O not determinable after diagnosis of disease X; (b) too few pairs involving a case of the disease and a family control available in which the two individuals differ with respect to factor O; (c) disease X occurring only or predominantly in one sex, sex associated with factor O, and spouses the only family controls available in sufficient numbers.

When the family control method can be applied, it has these advantages:

(A) The relative incidence rate of disease X in a population of individuals with factor O relative to the rate in their family members without the factor can be estimated from a relatively small study involving cases of the disease and their family controls.

(B) The method eliminates certain sources of positive relationships due to nonetiologic factors.

(C) It is relatively easy to obtain a study group of new cases of disease X and their family controls which will yield an estimate of the relative incidence rate under study that can be generalized to the subpopulation of

families free of the disease at the beginning of a recent period. On the other hand, it is difficult in practice to obtain a study group of new cases and independent population controls which will yield an estimate of the relative incidence rate that can be generalized to the total population free of the disease at the beginning of the period.

Summary

A method has been described for estimating the incidence rate of a disease in a recent time period in a population of individuals with an antecedent factor, relative to the rate in their family relatives of a specified type without the factor. The method utilizes a sample of new cases of the disease and a control group consisting of their family relatives of the specified type. The family relative is eligible for the control group if he was free of the disease at the beginning of the time period. Case-control pairs are tabulated according to the occurrence of the antecedent factor in each member of the pair. The estimate of the relative incidence rate under study consists of the following ratio:

$$\frac{\text{pairs in which the case has the antecedent factor and the control does not}}{\text{pairs in which the case does not have the antecedent factor but the control does.}}$$

The choice between possible family relatives as controls and the adjustment of the results to eliminate the influence of age and sex on the estimate of the relative incidence rate under study was discussed.

The family control method was applied to data from the Donora Health Survey. The survey had observed an association in the Donora, Pa., population between reported smog illness during the 1948 smog episode and subsequently reported heart disease. When persons with reported heart disease were compared with their spouses, the resulting association between smog illness and subsequently reported heart disease was at least as great as that found in the total Donora population. An attempt was made to interpret these results. The limitations and advantages of the family control method were discussed.

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This exceedingly clear analysis of the field of environmental sanitation is certain to be welcomed by all public health workers. It is an indispensable frame of reference for any endeavor to develop and to evaluate programs in this area of health action.

LEVELS IN ENVIRONMENTAL HEALTH

Frank M. Stead

THE PROGRAM AREA COMMITTEE on Environmental Health of the American Public Health Association undertook, as its first task, to spell out in a clear and graphic manner a fundamental description of the broad field of environmental sanitation. I wish to present the committee's concept in broad strokes.

Program Sectors

The field of environmental sanitation is composed of four basic sectors: Water Sanitation, Food Sanitation, Air Sanitation, and Shelter Sanitation.

Water Sanitation includes consideration of the quantity, quality, and safety aspects of water from the stages of planning, development, transportation, storage, treatment, distribution and use; on through the stages of treatment and disposal; or conservation, reclamation and reuse of waste water (or sewage). The concern of the public health agency goes beyond the uses to which public water supplies are put in cities, i.e., industrial and domestic uses. It extends as well to use of waters (fresh and salt) for recreation, irrigation, and food processing and includes conditions leading to production of mosquitoes as well as the chance exposure of people at work or play to polluted water. The committee anticipates that in the future there will be an increasing emphasis on water management involving the entire gamut of use and reuse with particular attention to water quality at every stage.

Food Sanitation encompasses the entire chain of events from production of food on land or sea, its processing, distribution, storage, and marketing down to the actual preparation and serving of meals and the disposal of wastes. It includes the effects of heat, irradiation, freezing, and other methods of treatment; contamination by dirt, microorganisms, insects or rodents; chemical additives, including radioactive substances, at any stage, both advertent and inadvertent; and the effects of all of these on the structure, safety, nutritional value, wholesomeness, and palatability of the food or beverage. The production of food takes one into the rural environment on land, and into the marine environment in water. Factors of contamination in food production must be dealt with in these outlying places since the ability to reclaim contaminated food by processing is limited. For the same reason, places where food is processed must be included. The food sanitation program, in other words, must "follow the food" back to its beginning and not be confined to places where food is sold or

served; it must even follow the food into the home and up to the instant of actual consumption.

Air Sanitation is involved with the physical, chemical, and biological quality of air as a natural resource. In air sanitation we are dealing with the physical factors of air temperature, humidity, and motion which govern the successful heat regulation of the human body as well as with those aspects of air quality which produce illness or death, affect respiration, cause odor nuisance, or irritate the exposed mucous membranes of the human body. We are concerned with point sources of dust, smoke, aerosol, gas vapor or mist as well as with generalized contamination of the air mass as a whole. Transparency of air is important as well as the presence in air of radioactive substances. We must be alert to air quality at home, at work, during travel, and during recreation; we are involved with air in enclosed spaces of all sorts as well as with outdoor air in cities and in rural areas.

The concept of Shelter Sanitation is also a broad one. It encompasses not only the field of housing as related to dwelling units, apartments, hotels, public buildings, trailers, and camps but also the general artificial and natural environment for work, play, and general living. Consequently, it includes much in the fields of the occupational or radiological microenvironment; it includes the whole field of protection of human beings from rigors of the elements, as well as the onslaught of insects, rodents, dust, dirt, odors, noise, radiation (other than by radioactive substances), accident hazards, and other detrimental impacts of the environment on man. This almost unexplored field affords a challenging opportunity for public health leadership and service. The omission of any of these four sectors would result in an unbalanced program.

Levels of Concern

In addition to the four sectors, the Program Area Committee believes that an environmental sanitation program should be based upon several levels of public health concern. The traditional criterion of public health concern, namely, the risk of disease or poisoning, should continue as a basic concept, but this concept must be broadened if public health is to keep abreast of today's urgent needs.

Experience has repeatedly shown that at times of earthquake, flood, and other natural disasters simple survival transcends all other concerns even those of communicable disease. At the other end of the scale, the public today demands services to cope with such environmental problems as air pollution in which there is, not only a concern with illness or potential disaster, but a deep feeling of anger and frustration because working efficiency is impaired and a very "way of life" is threatened.

To clarify this situation and put public health programs on a sound and logical basis in keeping with today's needs, the committee proposes that four basic levels of public health concern with the environment be enunciated and recognized as the legitimate bases for official public health activity. These basic levels of concern are:

1. Insuring the elements of simple survival;
2. Prevention of disease and poisoning;
3. Maintaining an environment suited to man's efficient performance;
4. Preservation of comfort and the enjoyment of living.

These levels are listed in the order of program precedence. It may well turn out, however, that in importance to society the latter two have the greater long-term significance. A program based upon only one, two, or three of these levels is a truncated program.

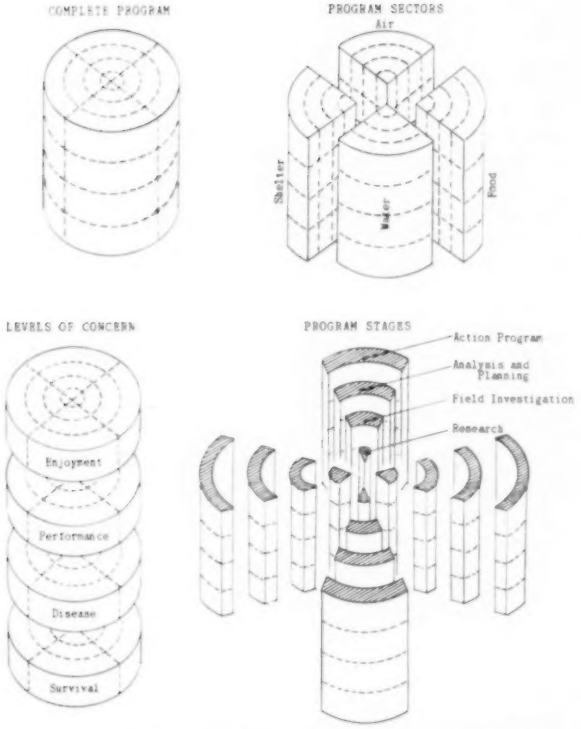

Figure 1—A Schematic Picture of Environmental Sanitation

Program Stages

The final subdivision of the field of environmental sanitation proposed by the Program Area Committee is based upon stages of program development. We feel that the central core or first stage of a sanitation program is research. If the research has been done once it need not be continuously repeated, but every program element must be rooted in dependable fundamental knowledge and every new technological advance must be matched by research as to its sanitation implications.

The second stage is field investigation. This means the systematic collection of field data and the measurement of existing conditions in the area, so that the program will be geared to actual rather than assumed conditions. This stage is a continuing one because the initial survey and investigation must be followed by continuing surveillance.

The third stage consists of analysis and interpretation of collected field data and the development of the action plan. This is an extremely important stage and one frequently ignored. It takes into account not only the peculiar or unique characteristics of the area for which the sanitation program is being designed but also the all important element of timing. A sanitation pro-

gram goes through a pattern of growth and development as it proceeds from beginning to maturity, and even at maturity it must be dynamic and respond to trends and changes in the environment and to patterns of land use in the development of industry and urban aggregations.

The final stage, and the only one visible to the community at large, is the action program itself. This stage comprises the actual achievement of a satisfactory standard of environmental sanitation through the employment, in suitable combination, of the tools of education, information, consultation, demonstration, persuasion, and law enforcement. The scientific soundness of the action program depends upon the research. The appropriateness and responsiveness of the action program as well as its continuing evaluation depend upon the field investigation. The balance, timing, and efficiency of the action program (efficiency measured in terms of maximum results per unit of effort) depend upon the analysis, interpretation, and planning stage. An action program not based upon all of the first three stages is a hollow or unsound program.

We have then for an environmental sanitation program four sectors, four levels, and four stages, in all, sixty-four separate and identifiable program elements. Their relationship to each other and to the program as a whole is shown in the diagrams. In planning the program one must look at and pass judgment on each of these 64 elements.

Mr. Stead is chief, Division of Environmental Sanitation, State Department of Public Health, Berkeley, Calif.

This paper was presented before the Health Officers Section and a Joint Session of the Conference of Municipal Public Health Engineers, the Conference of State Sanitary Engineers, and the Engineering and Sanitation Section of the American Public Health Association at the Eighty-Sixth Annual Meeting in St. Louis, Mo., October 27 and October 29, 1958.

Graduate Course in Public Health Statistics

The 1960 graduate summer session of Statistics in the Health Sciences, sponsored by the accredited schools of public health of the United States (under a research training grant from NIH), will be held at the University of Minnesota from June 16-July 30, 1960.

Curriculum topics are: "Statistical Methods in Public Health; Management of Health Agency Records; Biostatistics in the Health Sciences; Demographic Methods in Public Health; Registration and Vital Records; Advanced Biostatistics in the Health Sciences; Statistical Methods in Epidemiology; Sampling Techniques in the Health Sciences; Statistical Methods in Biological Assay; Lecture Series."

The faculty will include the following members and Fellows of APHA: Fay M. Hemphill, Ph.D., Albert E. Bailey, Ph.D., Carl L. Erhardt, Bernard Greenberg, Ph.D., Donovan J. Thompson, Ph.D., and Eugene A. Johnson, Ph.D.

A limited number of fellowships are available. Information from Professor Jacob E. Bearman, Ph.D., University of Minnesota, Minneapolis 14, Minn.

The theme of the following account is the encouragement of research in local health agencies through a state health department. California's experience will undoubtedly be of interest and value to others.

THE CALIFORNIA STATE PROGRAM TO PROMOTE LOCAL HEALTH DEPARTMENT RESEARCH

Robert Dyar, M.D., Dr.P.H., and George McKray, M.P.H.

THE CALIFORNIA PROGRAM to promote research in local health departments has several facets—encouraging local health agencies to make evaluation an integral part of their program planning and operation, offering consultative and limited financial assistance for furtherance of selected research interests, and providing limited training of staff for research activities. Perhaps the most important facet of the program and the one of principal interest here is that of local special project grants. Under this part of the program, local health agencies may obtain funds from the State Department of Public Health for special projects. Funds are allocated by the department on a competitive basis after receiving the recommendations of an Advisory Committee.

A brief background of the Local Project Grant Program, a summary of its objectives, the mechanism of operation, a report of current status, and a brief evaluation are presented below.

Background

Early in 1957, the Department of Public Health and the California Conference of Local Health Officers, after a year and a half of lively discussion, agreed to the initial use of $50,000 annually of federal Maternal and Child Health funds for a special projects program in local health departments. The conference was of the opinion that the solution of certain hard-core problems in maternal and child health in California could not be achieved by a general per capita distribution of so limited an amount of money, but that allocation of the $50,000 in lump sums to certain local health officers might initiate new studies and methods.

This discussion preceded by a few months the congressional action which increased General Health grant-in-aid funds. In announcing this action of Congress, the Surgeon General of the United States Public Health Service noted the statement of the Senate Appropriations Committee:

> "The additional funds recommended will permit . . . (an) increase (in the) quality and scope of preventive health services at the local level, particularly through the stimulation and support of health services for older persons, services for the prevention and control of chronic diseases, occupational health services and other newer and vitally needed health services; . . ."*

In July, 1957, the California Conference of Local Health Officers approved the following departmental policy state-

* Letter from the Surgeon General, United States Public Health Service to State Health Officers, dated July 2, 1957.

ment on the use of additional General Health grant-in-aid funds to be allotted to California:

"The State Department of Public Health is committed to the policy of assisting in the establishment and strengthening of local public health departments. In the past decade, local health department services have been extended to serve almost every citizen in California. Now it is timely to place emphasis upon making local health services more effective in meeting new and changing needs. In this respect, the State Department of Public Health is deeply concerned about the health problems of the gainfully employed and the chronically ill and aging; and believes that the local health departments should initiate activities to demonstrate means of prevention and control (in these areas).

"It is therefore proposed that for a period not to exceed five years, and subject to review in the fourth and fifth years, the increase in Federal General Health Funds available to California ($172,000) be used in a project grant program designed to develop local demonstrations of means to control chronic illness and improve health of the aging and occupational health services. . . . Such projects may include, but are not limited to, health education, specific disease case-finding, nutrition, organized home care services, rehabilitation, and improvement in nursing homes."

The three health programs—maternal and child health, chronic disease and aging, and occupational health—were combined in one Local Project Grant Program.

Historically, beginning in 1936, the California State Department of Public Health either had distributed federal grant-in-aid funds to local health departments, on the basis of the administrative judgment of the director and staff of the department, or had used them for the support of services within the State Health Department.

In 1947, state funds for local health departments were provided by passage of the State Public Health Assistance Act. At the same time, the amount of the federal grant-in-aid monies to be used at the state level was decreased. The remainder of federal funds and the newly appropriated state funds for local health jurisdictions were distributed on a formula basis (principally a per capita division).

The 1957 decision to reserve a portion of federal grant-in-aid funds for allocation to local health agencies requesting financial support for special projects was a major change in fiscal relations between state and local agencies, reflecting the need for funds for special purposes.

General Objectives

This special projects program is usually referred to as a means of promoting research in local health agencies. Its objectives are somewhat broader and derive from the following reasoning. An increased awareness of association between types of illness and social and demographic characteristics has suggested hypotheses for research into the causation of disease. It also permits those concerned with preventive measures to concentrate their efforts on those segments of the population which carry the greatest risk for certain diseases. Knowledge that the major causes of death, disability, and disease in California were not receiving the intensive effort toward prevention and alleviation that their importance justified also emphasized the need for demonstration programs. Because much of our attention was still being directed toward the traditional activities of public health, evaluation of those efforts, as well as of new programs, was believed in order.

The general aim of the State-Local Project Program is, then, to focus attention on the changing needs in the fields of occupational health, aging and chronic disease, and maternal and child health, and to advance public health knowledge and practice in these fields through the efforts of the local health departments in California. The activities the department hopes to stimulate by supporting special local projects in the three fields are:

(1) Epidemiologic Research—gaining new information useful to public health in these fields;

(2) Demonstration—applying new knowledge and technics in public health, taking action on information that has been gained by research and exploration;

(3) Evaluation—finding out whether the action taken has been effective and whether continuation is desirable, both for existing programs and proposed demonstrations.

These three terms—research, demonstration, and evaluation—although not used in their strictest sense, represent a cycle of progress.

Operation of the Program

In operation, a local health agency submits an application to the State Department of Public Health. Pending applications are reviewed twice annually by an advisory committee to the department, which makes recommendations to the state director of public health for his final action upon the applications.

(1) Applicant and Application—Applications are accepted only from local health departments; however, local health departments may subcontract with voluntary and allied health agencies. The application requires no specific form other than a fact sheet and budget, but the application should describe the proposed project, specific aims, method of procedure, and plan for evaluation. Upon request of an applicant, the staff of the State Health Department will assist in the preparation of a protocol and provide information with respect to this program. The entire consultant staff of the State Health Department is available for this purpose.

(2) Advisory Committee—The Advisory Committee provides policy guidance; reviews all applications, advising approval or disapproval; and gives priority ratings to the approved applications. The committee's recommendations are transmitted to the director for his action. The qualitative criteria for rating applications include clarity and worthiness of objectives, adequacy of proposed methods, soundness of the plan for evaluation, and practicality of budget, staff, and facilities. The committee rates the approved protocols by using a numerical rating system. Each application is rated by each member of the committee, using the figures one to five (one for an excellent application; five for lowest priority). The sum of the ratings is then divided by the number of raters to give the final priority. The applicants are notified of the committee's recommendations and of the director's decision within approximately 10 days of the Advisory Committee meeting. When applications are approved, contracts with the applicant are drawn up on a reimbursement basis. When applications are not approved, applicants are advised of the reasons therefor.

At present, the Advisory Committee is composed of three local health officers, two representatives of schools of public health, two representatives of schools of medicine (a dean and an associate dean), one nonmedical representative of a voluntary health agency, and one physician in private practice.

(3) Allocation of Funds—Support for specific projects is limited to a period not to exceed three years, and each project is subject to annual review. The applicant submits a yearly report on his progress in carrying out the objectives of the project as stated in the original application. The progress reports are reviewed by the Advisory Committee and recommendations for continuation are made to the director at the same time that the committee reports to him on new applications.

The annual grant to a single maternal and child health project is limited to $20,000 of the $50,000 presently reserved for that field. The annual grant to a single project in occupational health or aging and chronic disease is limited

to $10,000 of the $172,000 budgeted for these fields.

(4) Small-Scale Project Allocations—In addition to the above-described applications, proposals are considered for short-term, small-scale projects for the exploration of an idea for a larger project or the development of a plan for a more ambitious proposal. These allocations are nonrenewable, limited to one year's duration, and to a maximum of $2,000 and are acted upon by the department.

Status of Program

The Local Project Advisory Committee met on November 1, 1957, to consider applications for the 1957-1958 fiscal year. The 24 applications considered showed a wide variety of interest and an equally wide range of quality. Many local health officers had excellent ideas, but not all of these ideas were well developed and clearly presented. Eleven applications were approved and allocations made for them.

Then, to assist local health officers in the preparation of their applications for the next fiscal year 1958-1959, the state health department organized two workshops in January, 1958. There was no intent to teach "application writing," but rather to provide an opportunity for applicants to discuss their proposals with each other and with a group of expert consultants in the hope that their critical thinking might be sharpened, and that they would realize the importance of a clear, easily understandable proposal. More than 60 staff members from 25 local health departments attended these sessions.

As a result of these two-day workshops, the department is developing plans for a long-range training program to be offered to local health department staffs for the particular purpose of assisting in planning and evaluating study proposals.

To date, 45 applications (in addition to 13 small grant applications) have been submitted from 20 local health departments. The Advisory Committee has acted on 41 of these, recommending approval of 20 from 15 local health departments. In every instance, the director has accepted the recommendation of the committee. Approved projects include:

Demonstration of a Home Nursing Program in a Rural Area (Population less than 10,000)

Study of Gonadal Exposure from Medical Radiation

An Investigation of the Effects of Management Practice on Nutritive Value and Food Acceptance in Nursing Homes

Evaluation of a Hearing Conservation Program

Distribution and Characteristics of Micrococci in a General Hospital

Test of the Accuracy of Questionnaires used in Determining Immunization Status in a Community.

Nonintellectual Factors Relating to Under-Achievement of Bright School Children

Evaluation of Home Visit Education in Accident Prevention.

The total amount requested in approved maternal and child health applications exceeds the funds available. The committee agreed that worthy projects should be approved, whether or not sufficient money was available for all of them. Then, in case one or more projects fail to materialize, their places can be taken by other approved projects; or if additional funds are available, they can be put to immediate use. Projects approved without funds retain their ratings, and if after two years there are still no funds available, the project is dropped from the approved list but may be resubmitted.

Time does not permit a discussion of either the details of the program or the problems we have encountered in our short experience. The reception has generally been good, but some local governmental agencies fear that anything of a project nature is a "foot in the door" to increased local spending.

The fact that the program is limited to three special categories has led to difficulties in identifying applications as eligible. Timing to avoid lapsing funds has presented problems. But, generally, consideration by an expert committee of an application for funds for support of a special activity, and granting of funds to approved proposals on a quarterly reimbursement basis appear feasible.

The proposals submitted cannot in any sense be considered solely as research projects. Whether carefully designed technical studies or evaluations of administrative procedures, they involve a number of common elements—clear-cut, worth-while objectives; adequate methodology; a sound plan of evaluation; and appropriate staff and budget. The thinking necessary to approach these ideals is stimulating and cannot but contribute to the improvement of the quality of public health practice.

The California Local Project Grant Program has not been in operation long enough to make adequate evaluation possible. At this stage, there appear to be certain accomplishments—the stimulation of increased critical interest of local health departments in research and demonstration; the implementation of 20 projects; the added stimulation of joint activities of official and voluntary health agencies; the focus in local communities on new health problems; and the training and orientation of professional staff in addition to physicians in local health departments in critical, investigative methodology. The real evaluation will come when we see what kinds of new knowledge and experience produce change in public health practice, and whether there continues to be a demand from local health departments for support of special projects. In the meantime, we hope that others will join us in this stimulating new approach to the problems of present-day public health.

ACKNOWLEDGMENT—The authors are indebted to the three program directors of the California State Department of Public Health: Dr. W. H. Clark (Adult Health), Dr. Lester Breslow (Chronic Disease), and Dr. Leslie Corsa (Maternal and Child Health), and to the many California local health officers who have given their assistance in the program and their continuing constructive criticism.

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This paper was presented before a Joint Session of the Epidemiology, Health Officers, and Statistics Sections of the American Public Health Association at the Eighty-Sixth Annual Meeting in St. Louis, Mo., October 28, 1958.

A comparison is made in this paper of the response to a combined diphtheria-pertussis-tetanus-polio vaccine, to commercial polio vaccine, and to commercial DPT. The response to the polio vaccine was found significantly enhanced in the combined vaccine.

STUDIES ON A COMBINED DIPHTHERIA-PERTUSSIS-TETANUS-POLIOMYELITIS VACCINE

Lee F. Schuchardt; J. Munoz, Ph.D.; W. F. Verwey, Sc.D., F.A.P.H.A.

THE PRACTICE of using combined diphtheria, pertussis, and tetanus antigens (DPT) is well established, and the efficiency of DPT in pediatric practice has been discussed by Ipsen.[1] Trivalent poliomyelitis vaccine prepared from virus inactivated with formalin[2] has been demonstrated to be effective in reducing the paralytic effect of acute poliomyelitis[3,4] and to evoke a significant antibody response in infants.[5] The possibility of incorporating the poliovirus antigen into DPT has aroused considerable interest. The response of infants to poliomyelitis vaccine and DPT injected simultaneously into separate sites and to poliomyelitis vaccine mixed in a syringe with DPT just before injection has been reported by Batson, et al.[6,7] Kendrick and Brown[8] and Levine[9] have studied the antigenicity of such mixtures in animals. Barrett, et al.,[10] recently published the results of clinical studies of a combined DPT-poliomyelitis vaccine. This report describes the response of mice, monkeys and guinea pigs to "Tetravax," a combined DPT-poliomyelitis vaccine.

Materials and Methods

Preparation of Vaccines—The poliomyelitis vaccines used in all preparations were bulk samples taken from production lots of commercial poliomyelitis vaccine that later met all the minimum requirements and were released for distribution by the Division of Biologics Standards of the National Institutes of Health (NIH). The diphtheria and tetanus toxoids were formalin-treated, purified concentrates prepared without preservative. Bordetella pertussis cells were grown in the liquid media of Verwey, et al.,[11] and killed with 1:40,000 benzethonium chloride. Because of the deterioration in antigenicity of poliomyelitis vaccines containing certain preservatives,[12] benzethonium chloride at a final concentration of 1:40,000 was used as a preservative in all vaccines. The combined diphtheria-pertussis-tetanus and poliomyelitis vaccine (DPT-P) preparations were made by mixing poliomyelitis vaccine with the concentrated toxoids and pertussis vaccine. The formula was composed so that the diphtheria-pertussis-

tetanus components were contained in 0.1 ml and combined with 0.9 ml of poliomyelitis vaccine to yield an immunizing dose of 1 ml. Enough potassium alum was added to adsorb the antigens from solution and the reaction was adjusted to pH 7.0. Control vaccines of diphtheria-pertussis-tetanus were prepared from the same reagents used for each lot of the quadruple vaccine.

Tests for pertussis potency were performed by the intraperitoneal injection of mice with graded dilutions of the antigen and challenge after 14 days by the intracerebral injection of a mouse-virulent strain of B. pertussis.[13,14]

Tests for diphtheria and tetanus potency were performed according to recommendations of the NIH.[15,16] Guinea pigs were bled from four to six weeks after subcutaneous injection of the antigens. Equal portions of serum from all animals surviving the immunization period were pooled. The titer of the pooled serum was determined by mixing with test toxin and injecting the mixture into guinea pigs. The test dose of the toxins was determined by neutralization with the appropriate NIH standard antitoxin.

Tests for polio potency were done by comparison of the antibody levels produced in monkeys by the vaccine under test with the antibody levels of reference serums distributed by the NIH.[17] Groups of 12 rhesus or cynomolgus monkeys weighing from four to eight pounds were injected intramuscularly with three 1 ml doses of the vaccines at seven-day intervals. Blood samples were taken prior to vaccination and seven days after the last injection. Serum was separated and inactivated by heating at 56°C for 30 minutes. Antibody levels were determined by the serum-virus neutralization test essentially as described by Salk, et al.[18] The results are expressed as ratios of the titers of test serums to those of the reference serum.

Tests for freedom of toxicity were performed as recommended by the NIH.[13] Each of five Swiss mice, weighing 14-16 grams, was injected intraperitoneally with one-fifth the total human dose. The mice were weighed again after three and seven days. For a vaccine to be considered satisfactory the mice must all survive, not show a weight loss after three days, and show a normal weight gain after seven days.

Animal safety tests were performed using mice and guinea pigs as recommended by the NIH.[13] Each of three guinea pigs, weighing 300-400 grams, was injected intraperitoneally with the total human dose of the vaccine under test. Each of two white Swiss mice, weighing 17-21 grams, was injected intraperitoneally with 0.5 ml of the vaccine under test. All animals were observed for seven days. For a vaccine to be considered satisfactory, all the

Table 1—Potency Tests of Diphtheria and Tetanus Toxoids*

	Diphtheria		Tetanus	
Lot No.	DPT-P†	DPT‡	DPT-P	DPT
A	3§	–	5	–
B	4	4	8	7
C	4	4	5	7
D	3	3	8	8
E	4	4	8	5
F	2	3	6	8
G	4	4	4	3
H	2	–	2	–
I	2	2	5	4
J	2	–	5	–
K	4	–	>2	–

* 1.5 ml of vaccine was injected subcutaneously into nine or ten normal guinea pigs weighing 500 grams ±10 per cent. The animals were bled after four weeks, and the serum pools were titrated for antitoxin by mixing with the appropriate test toxin and injecting the mixture into two guinea pigs.

† DPT-P—Combined diphtheria-pertussis-tetanus-poliomyelitis vaccine.

‡ DPT—Combined diphtheria-pertussis-tetanus vaccine.

§ Antitoxin units per ml. (NIH requirements: two units.)

animals must survive and must not show either significant symptoms or loss in body weight.

Results

Diphtheria and tetanus potency tests were performed simultaneously on several lots of DPT-P and their respective DPT control vaccines. The results of these tests are summarized in Table 1. All of the preparations met the NIH minimum requirements for both diphtheria and tetanus potency. The antitoxin responses elicited to both toxoids by the quadruple vaccine were equivalent to those produced by the triple vaccine. This indicates that poliomyelitis vaccine does not alter the antibody response in guinea pigs to either diphtheria or tetanus toxoid.

Simultaneous potency tests for pertussis were done on several lots of DPT-P, DPT, and the pertussis concentrates from which they were made. All of the preparations (Table 2) met the NIH minimum requirements for pertussis potency. The response to the pertussis component in the quadruple vaccine was not significantly different from the response of the pertussis component in either DPT or alone. Although there are some variations in the test results, it appears that in mice poliomyelitis does not interfere with the antibody response to pertussis vaccine.

The DPT-P preparations and their poliomyelitis vaccine components were assayed for polio potency in monkeys. The results are given in Table 3. With the exception of Lot A, all vaccines exceed the minimum requirements. The polio type responding best in each lot appears to run parallel in both DPT-P and poliomyelitis vaccine. The increased response of the quadruple vaccine as compared to its corresponding poliomyelitis vaccine is shown also in Table 3. In every instance, except the Type I components of Lots A and D, the DPT-P preparations gave a better response to poliovirus than the poliomyelitis vaccines alone. This increased response by the combined vaccine is highly significant ($P = \ll 0.001$). It is of interest that in Lot A where the Type III component of the poliomyelitis vaccine was poor, there appears to be no enhancement in the combined vaccine.

The results of tests for freedom of toxicity and animal safety are summarized in Table 4. With the exception of Lot A, all of the DPT-P and control DPT preparations were found to meet the minimum requirements of the NIH. Lot A was prepared from a pertussis concentrate subsequently shown to be highly toxic. Preliminary toxicity testing of pertussis concentrates eliminated this difficulty.

One lot of the quadruple vaccine (Lot C) was tested for diphtheria and tetanus potency initially and again after six and 12 months' storage at 2°-5°C. The results of these tests (Table 5)

Table 2—Summary of Pertussis Potency Tests*

Lot. No.	DPT-P†	DPT‡	Pertussis Concentrate
A	42.6§	—	22.4
B	21.5, 9.5	22.2	20.8
C	14.2	22.2	20.8
D	17.6	18.3	14.4
E	20.5	22.7	9.3
F	24.6, 10.3	18.4, 9.2	6.7, 11.2
G	22	12	28, 17, 23
H	15	—	14
I	7, 15.5, 12	10	11
J	40	—	58
K	10	—	17

* Mice were injected with graded doses of vaccine and 14 days later challenged intracranially with 100T organisms of B. pertussis (strain 18-323).
† DPT-P — Combined diphtheria-pertussis-tetanus-poliomyelitis vaccine.
‡ DPT—Combined diphtheria-pertussis-tetanus vaccine.
§ Protective units per total human dose. (NIH requirements: 3.0—36 units.)

Table 3—Summary of Potency Tests in Monkeys on Poliomyelitis Vaccine

Lot No.	Antigen	Type I		Type II		Type III	
A	DPT-P*		0.67†		1.52		0.08
	Poliomyelitis Vaccine		0.72		1.03		0.06
	Increase		(0.05)‡		0.49		0.02
B	DPT-P		0.81		4.92		0.43
	Poliomyelitis Vaccine		0.76		2.14		0.41
	Increase		0.05		2.78		0.02
C	DPT-P		0.71		4.28		1.52
	Poliomyelitis Vaccine		0.33		0.61		0.38
	Increase		0.38		3.67		1.14
D	DPT-P	0.31	0.29	1.74	1.63	1.86	1.41
	Poliomyelitis Vaccine	1.51	0.81	1.74	0.76	1.63	1.07
	Increase	(1.20)	(0.52)	0	0.87	0.23	0.34
E	DPT-P		0.54		2.46		1.23
	Poliomyelitis Vaccine		0.33		0.61		0.38
	Increase		0.21		1.85		0.85
F	DPT-P	1.41	1.07	2.14	4.28	4.00	2.14
	Poliomyelitis Vaccine	0.93	0.35	1.07	1.00	0.62	0.31
	Increase	0.48	0.72	1.07	3.28	3.38	1.83
G	DPT-P		1.15		2.46		1.74
	Poliomyelitis Vaccine		0.54		0.76		0.76
	Increase		0.61		1.70		0.98
I	DPT-P		1.87		5.65		4.29
	Poliomyelitis Vaccine		0.54		0.76		0.76
	Increase		1.33		4.89		3.53
J	DPT-P		1.41		5.66		4.59
	Poliomyelitis Vaccine		1.00		2.46		2.46
	Increase		0.41		3.20		2.13
K	DPT-P	1.23	4.00	3.24	6.06	4.28	13.00
	Poliomyelitis Vaccine	1.41	1.41	1.51	1.51	2.30	2.30
	Increase	(0.18)	2.59	1.73	4.55	1.98	10.70

* DPT-P—Combined diphtheria-pertussis-tetanus-poliomyelitis vaccine.
† Ratio of test serum to NIH reference serum. (NIH requirements: Type I, 0.29; Type II, 0.25; and Type III, 0.16.)
‡ Brackets around figures indicate a decrease.

Table 4—Tests for Freedom of Toxicity* and Animal Safety†

Lot No.	Freedom of Toxicity		Animal Safety	
	DPT-P‡	DPT§	DPT-P	DPT
A	U¶	–	U	–
B	S	S	S	S
C	S	S	S	S
D	S	S	S	S
E	S	S	S	S
F	S	S	S	S
G	S	S	S	S
H	S	–	S	–
I	S	S	S	S
J	S	–	S	–
K	S	–	S	–

* Each of five mice, weighing 14–16 gm, was injected intraperitoneally with one-fifth the total human dose. For a vaccine to be considered satisfactory, all the mice must survive, not show a weight loss after three days, and show a normal weight gain after seven days.

† Each of three guinea pigs (300–400 gm) was injected intraperitoneally (i.p.) with the total human dose of vaccine. Each of three mice (17–21 gm) was injected i.p. with one-half ml of vaccine. For a vaccine to be considered satisfactory, all the animals must have survived and not show significant symptoms for seven days.

‡ DPT-P — Combined diphtheria-pertussis-tetanus-poliomyelitis vaccine.

§ DPT—Combined diphtheria-pertussis-tetanus vaccine.

¶ U—Unsatisfactory. S—Satisfactory.

show that the toxoid components of DPT-P are stable for at least 12 months when held at 2°-5°C.

Samples of four lots of DPT-P and their control DPT components were tested for pertussis potency after storage at 2°-5°C for periods up to 12 months. The results summarized in Table 6 show that in the quadruple vaccine the pertussis potency has not changed significantly. Although there are some discrepancies in the testing, we may conclude that the pertussis component is stable for at least from eight to 12 months when held at 2°-5°C.

Three lots of DPT-P and the poliomyelitis vaccines from which they were prepared were stored at 2°-5°C. The vaccines were potency tested in monkeys at the time of their preparation and again approximately one year later. The results summarized in Table 7 show that all three lots still exceeded the minimum requirements. Although the variability of the monkey potency test makes statistically valid conclusions impossible, it appears that with the possible exception of Type III, the polio components are stable when held at 2°-5°C for periods up to one year.

Discussion

The most obvious advantage in the use of multiple antigens is the fewer injections required. Also the protection against a disease of low incidence such as tetanus becomes practical. Another advantage may be the synergistic effects reported by Greenberg and Fleming,[19] who demonstrated that the addition of H. pertussis vaccine to diphtheria and tetanus toxoids enhances the activities of both antigens.

There also are certain problems in the use of combined antigens. These include difficulties in formulation, incompatibilities, and the proper timing of injections so that the several antigens produce at least as good response to the individual antigens as if they were used separately. It is important that

Table 5—Stability* of Diphtheria and Tetanus Toxoids in DPT-P†

Storage Period	Diphtheria Toxoid	Tetanus Toxoid
Original	4‡	5
6 months	4	4
1 year	4	4

* DPT-P—Lot C was held at 2°–5°C and tested periodically for diphtheria and tetanus potency. One and one-half ml of vaccine was injected subcutaneously into nine or ten normal guinea pigs weighing 500 grams ± 10 per cent. The animals were bled after four weeks, and the serum pools were titrated for antitoxin by mixing with the appropriate test toxin and injecting the mixture into two guinea pigs.

† DPT-P — Combined diphtheria-pertussis-tetanus-poliomyelitis vaccine.

‡ Antitoxin units/ml (NIH requirements: two units.)

Table 6—Stability* of B. pertussis Vaccine in DPT-P† and DPT‡

Lot No.	Storage Period	DPT-P	DPT
B	Original	15.5§	22.2
	8 months	14.0	—
	12 months	—	14.5
C	Original	14.2	22.2
	6 months	6.0	—
	8 months	11.0	—
	12 months	9.0	14.5
D	Original	17.6	18.3
	8 months	20.0	—
	12 months	—	10.5
F	Original	17.4	13.8
	5 months	9.0	—

* Vaccine stored at 2°–5°C were tested for pertussis potency in mice.
† DPT-P — Combined diphtheria-pertussis-tetanus-poliomyelitis vaccine.
‡ DPT—Combined diphtheria-pertussis-tetanus vaccine.
§ Protective units per total human dose. (NIH requirements: 8.0—36 units.)

multiple antigens cause no untoward reactions; nor when mixed, should one constituent lessen the antigenic potency of the others. These problems have been overcome with the quadruple vaccine.

Kendrick and Brown[8] reported a possible depression of the serologic response of guinea pigs to diphtheria and tetanus toxoids and to poliomyelitis vaccine when these antigens were administered together in DPT-P. Levine[9] studied the effect in guinea pigs of mixtures of diphtheria toxoid and poliomyelitis vaccine and found no significant effect on the response of the animals to the toxoid due to the vaccine. We found no suggestion of a depression of the antigenic response of guinea pigs to either diphtheria or tetanus toxoids. The response of poliomyelitis vaccine in guinea pigs was not followed.

Kendrick[8] also reported that all antibody levels appeared to be somewhat higher in monkeys following injection of the combined products than following poliomyelitis vaccine alone. Our results indicate that this increased response of monkeys to poliomyelitis following injection of the combined product is highly significant. Although it may be dangerous to generalize on the basis of results in one animal species, one is always hopeful that the increased response will be the case in human beings. The reports of Barrett, et al.,[10] and Batson, et al.,[6,7] have indicated no evidence of any interference between the antigens when injected into human beings.

The proposed schedule for the use of the quadruple vaccine will be 1 ml each month for three months followed by a 1-ml booster dose from six to 12 months later. In contrast, the recommended schedule for poliomyelitis vaccine is two injections of 1 ml each spaced four weeks apart, and a 1-ml booster dose from six to 12 months after the second injection. The proposed schedule for the quadruple vaccine will insure that the patient receives 2.7 ml of the poliomyelitis vaccine component during the first three months of immunization rather than the usual 2 ml, and that the total immunizing dose will be 3.6 ml rather than the usual 3 ml. The additional quantity of vaccine administered may be of importance in view of recent discussions regarding the antibody response to poliomyelitis vaccine.[20]

The combined diphtheria-pertussis-tetanus-poliomyelitis vaccine has undergone extensive clinical studies and the results will be reported elsewhere.

Summary

A combined diphtheria-pertussis-tetanus-poliomyelitis vaccine was prepared and compared with commercial diphtheria-pertussis-tetanus vaccine and with commercial poliomyelitis vaccine. The diphtheria, pertussis and tetanus components responded equally well in the triple

Table 7—Stability* of Poliomyelitis Vaccine in DPT-P†

Lot No.	Storage Period	DPT-P			Poliomyelitis Vaccine		
		Type I	Type II	Type III	Type I	Type II	Type III
C	10 weeks	0.71‡	4.28	1.52	0.33	0.61	0.38
	6 months	0.31	1.62	0.57	—	—	—
	8 months	0.20	0.66	0.43	—	—	—
	14.5 months	0.41	1.32	0.71	—	—	—
D	Original	0.31	1.74	1.86	1.51	1.74	1.63
	"	0.29	1.63	1.41	0.81	0.76	1.07
	12 months	0.57	2.14	0.76	0.62	2.00	0.76
F	Original	1.41	2.14	4.00	0.93	1.07	0.62
	"	1.07	4.28	2.14	0.35	1.00	0.31
	12 months	1.23	3.73	1.32	1.15	1.86	0.71

* Vaccines stored at 2°–5°C were tested in monkeys for polio potency.
† DPT-P—Combined diphtheria-pertussis-tetanus-poliomyelitis vaccine.
‡ Ratio of test sera/control sera. (NIH requirements: Type I, 0.29; Type II, 0.25; and Type III, 0.16.)

and quadruple vaccines. The response to poliomyelitis vaccine was enhanced significantly in the combined vaccine. The combined antigen was shown to be safe, free of toxicity, and stable at 2°-5°C for at least one year.

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Kimble Methodology Research Awards

The Conference of State and Provincial Public Health Laboratory Directors is accepting until June 1, 1960, nominations for the 1960 and ninth annual Kimble Methodology Research Award. The award of $1,000 and a silver plaque gives recognition to the application of scientific knowledge in the public health laboratory. Established by the Kimble Glass Company of Toledo, the award is presented at the annual meeting of the conference, one of the related organizations joining in the 88th Annual Meeting of the APHA in San Francisco, October 31-November 4, 1960.

In order to be considered for nomination a candidate's work must be either a fundamental contribution to the development of diagnostic methods applicable to a public health laboratory or the adaptation to such a laboratory of a fundamental contribution.

Complete details of the specifications are available from the chairman of the Nominating Committee to whom nominations should also be sent. P. R. Edwards, Communicable Disease Center, P. O. Box 185, Chamblee, Ga.

Mental stress has been alleged to have a causal relation to mental illness. In an endeavor to test one facet of this hypothesis, the author of the following study undertook to test experimentally what happens to behavior when in a given situation one alters a factor likely to produce stress. This provocative study will be of interest to many readers. Its value is enhanced by an equally provocative discussion.

SOURCES OF INFECTION REVEALED IN PREVENTIVE PSYCHIATRY RESEARCH

Ralph H. Ojemann, Ph.D.

THE PHRASE "sources of infection" has a very definite, rich meaning when employed in discussing diseases of the body. In this paper I endeavor to apply the general idea to mental and emotional disturbances. It has often been suggested that a considerable proportion of mental strain arises from interpersonal relationships. Examining the interaction process in order to formulate hypotheses as to how such interactions may increase or decrease mental strain, it appears that the probability of strain tends to increase when one person reacts to the outward form of another's behavior or in an arbitrary judgmental way toward him. Response to the outward form of behavior or reacting in an arbitrary judgmental way may be contrasted with reactions that take account of, or are sensitive to, probable causal or antecedent factors which produced the behavior.

The distinction between a noncausal and a causal orientation may be clarified by an example. All of us are familiar with the well established finding that a child's refusal to eat a particular food may be due to many different factors. The child may not have learned to adjust to the taste or consistency of the food, or he may have learned that this food was very important in the eyes of the parent and teacher and that by refusing it, he gains a measure of control over the parent. Refusal becomes for him a way of achieving a sense of accomplishment or power; there may be many other factors. If a person is not sensitive to the possibility that such causes are operating, he may scold the child, force him to eat, reprimand him, or ignore the behavior. It appears plausible that scolding or forcing a child who already feels inadequate may intensify the feeling of inadequacy and thus increase mental strain.

There is some evidence to support the hypothesis that such arbitrary judgmental, noncausal approaches tend to produce dissatisfying human relationships. Studies by Wilkinson[3] with teachers and Morgan[2] with adolescents provide data on this point.

It is not known how intense the

mental strains arising from interpersonal relationships may become or how deep they may go, but the files of every psychiatrist are filled with cases of well recognized mental illnesses in which, after thorough study, no special organic factors were found—the indicated therapy was essentially through changed interpersonal relations. It appears in such cases that the noncausal interpersonal relations played a significant part.

Several types of evidence obtained in our studies have suggested that children, as they grow up in our culture, are actually being taught a noncausal orientation to their social environment. To put it in other words, they are being "infected with" an arbitrary judgmental or noncausal approach to their social world. It appears that this "infection" is carried by several channels which include the teacher as he demonstrates more of a noncausal approach in his daily interactions with pupils in the classroom, the content which is taught in school, and the parents' example in the home environment.

Of the various influences mentioned above, perhaps the one requiring some explanation is the content taught in school. How can the content in the child's readers, textbooks, and other learning aids mediate a noncausal influence? In other papers[5] examples of content have been cited and results of analyses have been detailed showing that in much of the content in social studies, general reading, and other areas concerned with the social environment human behavior is considered very largely in noncausal terms.

One type of evidence demonstrating that the content taught and the teacher's behavior are "infecting" the child with a noncausal orientation is provided if we can show that when the sources of infection are cleaned up (i.e., teachers are trained to practice a causal approach in the school situation and more causally oriented content is provided for the pupil to study) we reverse the growth toward a noncausal, judgmental way of dealing with human situations and produce growth in a more causally oriented direction.

First, let us examine what is found when we measure the causal-noncausal orientation under conditions as they now exist. To do this we used a test consisting of a series of 22 problem situations, each provided with six ways of dealing with the situation. These responses represented a range from arbitrary punitiveness to a more causal approach. For example, one item reads: "Lucille is five years old. Her mother has told her not to hit her baby sister who is two years old. One afternoon Lucille gets very angry at her sister and hits her. The baby begins to cry loudly. Lucille's mother rushes into the room. What should the mother do?"

This is followed by such responses as: She should scold Lucille; hit Lucille and see how she likes it; ask what happened and so on. The score is the number of situations the child would approach in an arbitrary punitive way.

It is recognized that a test of this type may not probe as deeply as the more indirect methods which we are attempting to devise. However, the Problem Situations Test (PST) has been shown to be related to extrapunitiveness and intrapunitiveness as measured by the Rosenzweig Picture Frustration Test.[1]

The PST has an estimated reliability for pupils at the later elementary level of 0.77 as determined by the Kuder-Richardson formula 20. Its correlation with the IQ when using fifth-grade pupils has been found to be -0.29.[4] The test is so constructed that a higher score indicates more of a noncausal approach and a lower score a more causal one.

Table 1 presents the initial and final scores of four sixth-grade classes. These

data are from the elementary schools in a midwestern city of approximately 80,000 population. The classes were all used in a study of teachers' knowledge of pupils. No special training was given these classes; they were taken as we found them. The initial test was given in the fall, the final test in the spring. Inspection of the means indicates that there were no changes. The groups were as noncausal at the end of the year as they were at the beginning. In three of the four groups the final means are slightly higher than the initial means. There is a trend, although not a significant one, toward a more noncausal score at the end of the year.

If our hypothesis is correct, that the school experiences as presently constituted tend to produce a noncausal orientation, one should expect to find that when we changed the teacher and the content to a more causal nature, a more causal orientation should appear in the pupils.

This is exactly what we have found. Table 2 presents data from four classes in the elementary school. There are one fourth-, one fifth- and two sixth-grade classes. Each experimental class is provided with a control group matched as to intelligence of children and age, sex, years of teaching experience, and education of teachers. The teachers in the experimental program attended a summer training session of four weeks' duration and participated in monthly training conferences during the year. They were supplied with causally oriented teaching content described elsewhere.[4]

First we may note again the behavior of the scores of the control group—the group in which nothing was done. We note that in this sample also, the final means tended if anything to be a bit higher than the initial means. In other words, this group of subjects was at least as noncausal at the end of the school year as it was at the beginning.

What happened in the experimental group? First inspection of the means shows a considerable drop. This is true in all classes and in the total. A variance analysis of these scores as they stand showed that the differences between the changes in the experimental group and control group are significant well beyond the 1 per cent level of confidence.

Since there are slight differences in the initial means from class to class, the scores should be adjusted by covariance. However, due to certain characteristics of the test, the requirement for homogeneity of regression of final scores on initial scores is not met and the proper test to apply in such cases is a nonparametric test. The sign test was used. In applying this test each pair of pretest and posttest scores was

Table 1—Initial and Final Scores—Problem Situations Test Sixth-Grade Nontrained Groups (Series III)

Class	N	Initial Scores		Final Scores		Difference
		Mean	S. D.	Mean	S. D.	
6-I	19	4.89	3.06	5.00	3.66	−0.11
6-II	25	4.48	3.02	4.96	3.01	−0.48
6-III	19	4.47	2.39	5.21	3.12	−0.74
6-IV	18	5.94	3.12	4.67	2.54	1.27
Total	81	4.90	2.98	4.96	3.11	−0.06

Table 2—Mean Pretest and Posttest Scores on the PST

Grade	Experimental				Control			
	N	IQ	Pre	Post	N	IQ	Pre	Post
4th	19	110.89	5.05	3.74	16	106.31	5.81	7.47
5th	19	108.47	4.95	2.32	16	109.94	4.50	5.13
6th (I)	19	111.74	4.74	2.00	16	108.63	6.63	6.06
6th (II)	19	105.68	5.95	1.53	16	107.88	4.56	4.06
Total	76	109.20	5.17	2.39	64	108.19	5.38	5.67

compared for direction of change. A plus indicated that the posttest score was larger than the pretest; a minus indicated the reverse, and a zero meant no change. A chi-square was then applied to the frequencies.

The data are presented in Table 3. Chi-square of 33.904 with d.f.=2 is significant beyond the 1 per cent level. The experimental group was significantly more causally oriented than the control group. The trend toward a continuation of the noncausal approach has been reversed in the experimental group.

We suspected the behavior of the teacher and the content taught. Although the teachers and classes were matched with respect to sex, age, experience, and formal education, it is still possible to raise the question: Was the more causal type of growth observed in the experimental classrooms determined by the personality of the particular teachers who happened to be selected for the experimental group? Perhaps the "experimental" teachers produced the effects not as result of their causal training and use of causally oriented teaching content but because of their personality.

Through a combination of circumstances an opportunity developed to throw light on this question. It happened that two teachers served in both capacities—one year as a control teacher and the next as an experimental teacher. It is interesting then to compare the growth of the children using the same teacher for two successive classes. The principal change in the teachers' experiences was that between the year they served as control teacher and the year they served as experimental teacher they attended a four-weeks' workshop designed to train them to teach a causal orientation using specially prepared materials and to practice it in the classroom.

Table 4 shows the results for teacher 1.* She is a sixth-grade teacher. There were 31 pupils in the class the year she served as a control teacher; their mean IQ was 101.25. The next year when she served as an experimental teacher the mean IQ of the class was 100.77.

Two tests were used in measuring changes in causal orientation. One was the PST mentioned previously; the other is labeled a causal test. It consists of a total of 30 items which are reactions to the eight situations presented. Each of the items can be scored as a causal or noncausal response; a lower score indicates greater causality; the scores can range from 0 to 30.

Since there were no significant differences in IQ, we can make the comparisons directly. When teacher 1 served as a control teacher the mean gain on

* Appreciation is expressed to Dr. Bill Snider of the Preventive Psychiatry Staff for the analyses of these data.

Table 3—Sign Test Analysis of Pretest Posttest Scores on PST

	Plus	Minus	Zero	Total
Experimental	6	57	13	76
Control	31	20	13	64
Total	37	77	26	140

Chi-square = 33.904 d. f. = 2 1% level = 9.210

the causal test was 2.10. The mean gain when she served as an experimental teacher was 4.55. The difference is significant beyond the 1 per cent level as indicated by a t of 2.593.

Another method of presenting the data is to consider mean scores instead of mean gains. Such data are presented in the lower part of the table. The means on the causal pretest were not significantly different when teacher 1 served as control teacher and when she served as experimental teacher. On the posttest, however, the experimental group was significantly more causal. Similar results were obtained for the PST.

In other words, the year teacher 1 served as a control the class made no significant change on either test. When she became an experimental teacher, there were significant gains on both.

The data for teacher 2, a fourth-grade teacher, are given in Table 5; they are not quite as neat but show similar results. For some unexplained reason the classes differed significantly in IQ. One year the IQ was 107.21; the second year it was 118.21. Hence adjustment by covariance was necessary. The classes in this group were smaller in size than those for teacher 1. To obtain equal numbers in the experimental and control groups a random selection from the control group was made. Using adjusted mean scores and mean gains we obtained the following results:

The adjusted mean gain on the CT when teacher 2 served as a control teacher was 2.00; when she served as an experimental teacher it was 8.57. The difference is significant beyond the 1 per cent level.

The adjusted mean gain on the PST under the control conditions was −2.04. The minus sign deserves some explanation. It indicates that under the control conditions the group actually tended to become more arbitrarily punitive. We have noted this tendency in other control classes. Since under our present cultural conditions both teacher and teaching content relating to human behavior as now found in school textbooks tend to be noncausally oriented, it is not surprising that a more noncausal orientation would appear in the learners. That it appears is indicated by the minus sign.

Table 4—Data for Teacher 1 When Serving as Control and as Experimental Teacher

Comparison Using Gains

	N	Mean Gain as Control Teacher	Mean Gain as Experimental Teacher	t
CT	31	2.10	4.55	2.593*
PST	31	1.10	3.00	2.722*

Comparison Using Mean Test Scores

	N	Mean as Control Teacher	Mean as Experimental Teacher	t
CT-Pre	31	10.94	10.00	0.803
CT-Post	31	8.84	5.45	2.975*
PST-Pre	31	6.68	5.68	1.036
PST-Post	31	5.58	2.68	4.050*

* Significant beyond the 1 per cent level.

Table 5—Data for Teacher 2 When Serving as Control and as Experimental Teacher

Comparison Using Gains

	N	Adj. Mean Gain as Control Teacher	Adj. Mean Gain as Experimental Teacher	F	Sig.
CT	14	2.00	8.57	12.938	beyond 1%
PST	14	−2.04	3.90	23.488	beyond 1%

The assumption of homogeneity of regression was clearly tenable in the above ($F_{ct} = 1.022$; $F_{pst} = 1.070$)

Comparison Using Mean Test Scores

	N	Adj. Mean as Control Teacher	Adj. Mean as Experimental Teacher	F	Sig.
CT-Pre	14	14.13	13.79	.024	Not Sig.
CT-Post	14	12.14	5.22	13.825	beyond 1%
PST-Pre	14	5.44	5.48	.000	Not Sig.
PST-Post	14	7.49	1.58	28.097	beyond 1%

The assumption of homogeneity of regression was clearly tenable in the above ($F = 1.543$, 0.189, 2.318 and 0.899 respectively)

Under the experimental conditions the class made a significantly greater gain in the causal orientation than under the control conditions as shown by the data in the table.

A comparison of mean scores instead of mean gains shows, of course, essentially the same results. On the causal test at the beginning of the year (pretest) the experimental and control classes did not differ significantly. On the posttest at the end of the year they differed significantly beyond the 1 per cent level. Similarly, there were no significant differences on the Pre-Problem Situations Test but a significant difference beyond the 1 per cent level on the Post-PST.

From these data it appears that it is not the personality of the teacher as such that produces the changes in a causal orientation. The only known difference between the experimental and control situations centers in the training of teachers and in the changed content taught.

Providing content, however, involves some interesting problems which indicate how the cycle of infection may be transmitted from one generation to another. For example, our examination of the content of children's literature indicated that only relatively infrequently do we find a teacher or parent character who really tries to understand the child with whom he interacts.

There are many stories in which the child character is seriously worried about a situation but whose parents and teachers are quite unaware of, or unconcerned with what is going on until some crisis makes the whole situation painfully apparent. Thus the kind of parental and teacher behavior that the child hears or reads about is largely and often quite dramatically noncausal in character. Unless this is balanced by equally dramatic literature in which parents and teachers operate causally, the child is likely to get the idea that most parents and teachers are noncausal or arbitrarily punitive and that this is the way one lives with people.

Can interesting, dramatic material of high quality be prepared in which teachers and parents show understanding of, and insight into child behavior? We put this question to a group of nationally recognized writers of children's literature.

It was pointed out in the discussion with the writers that often an author is at his best when his words flow from his deepest experiences. Suppose a writer has grown up in a home torn by conflict and in a school in charge of a nonunderstanding teacher. A sensitive child, as the future writer is apt to be, may feel deeply the wounds that such an environment may inflict. If he writes from his deepest experiences he may tend to write about noncausal parents and teachers. It will require a fertile imagination and much creative ability to rise above his own bitter experiences and produce a story describing with depth of feeling how a teacher, parent, and child can live causally and how the daily situations can be worked out to minister to the security and sense of personal worth of all those involved. At present the available material contains few such examples.

Thus we tend to have a kind of cycle. The writer who as a child has lived in a noncausally oriented environment feels keenly the frustrations that such an environment tends to produce. He writes with feeling about his experiences replete with examples of noncausal living. The child—that is the next generation—hears and reads about noncausal living. He has but few examples of equal dramatic quality concerned with causal living. The data presented have suggested that under such conditions the growth toward arbitrary punitive approaches will not be changed but rather the cycle will tend to be continued. However, with more causally oriented material in the hands of a trained teacher the growth toward a noncausal orientation as measured in this study can be altered and thus the cycle of infection can be interrupted.

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Dr. Ojemann is chairman, Preventive Psychiatry Research Program, State University of Iowa, Iowa City, Iowa.

This paper was presented before the Mental Health Section of the American Public Health Association at the Eighty-Sixth Annual Meeting in St. Louis, Mo., October 28, 1958.

DISCUSSION

Benjamin Pasamanick, M.D., F.A.P.H.A.

FOR AT LEAST two decades that I know of, Professor Ojemann has constructed hypotheses dealing with the causation of psychologic disturbance by one factor after another. We are all adept at this kind of manufacture but extraordinarily little effort has gone into the experimental testing of what happens when one attempts to remove or alter this hypothetical variable. Professor Ojemann has been doing just this for a long time. He has tested one independent variable after another in well-designed studies. We are deeply grateful to him for his pioneering and almost unique efforts in this direction.

I have a few comments and questions concerning his paper. The causality-noncausality hypothesis offered would appear to possess almost face validity. It must be extremely frustrating to merely memorize facts and relationships in school. However, is one cause or explanation for cause as good as another? Can we offer any cause or explanation to a student whether true or not and expect to lower the number of difficulties? I should think that a more questioning approach to causation or causative explanations is warranted. It might become just as frustrating and disorganizing to a child to always have to present causation when at times no adequate or known cause exists. Psychiatrists themselves are often in this situation and frequently become dogmatic and rigid because of their felt need to have causal knowledge available to themselves and to patients.

A few methodological points are in order. In another paper to which the author refers, he states that the teachers knew the nature of the study. Could they have consciously or unconsciously pushed proper replies to the instruments which were administered? The results following practice effects and training on tests of intelligence would be a proper analogy. This is not necessarily an unfortunate methodological difficulty, but it then becomes incumbent to show that the causality responses were more closely related to other areas of behavior showing either elimination of disturbance or the appearance of more desirable behavior patterns.

In a psychological report when we have nothing else to criticize, we discuss instruments. There has been considerable tendency to gloss over the validity of psychological instruments and a good deal of discussion is centering on this issue. Presentation of data on reliability is no longer sufficient. High correlations with the Rosenzweig Picture Frustration Test is not enough when it has been shown that this test has questionable validity in differentiating the disturbed from the nondisturbed individual. In addition, I was unable to secure any details concerning the Problem Situation Test.

Professor Ojemann's title for this paper does not seem quite apropos. For instance no sources of infection were revealed. This is probably due to the fact that originally he was going to give a longer and more detailed paper. However, it is the use of the term preventive psychiatry that I question in association with the independent variable in this study. There is an implicit assumption that noncausal teaching causes psychiatric illness or disturb-

ance. This is an assumption and has not been tested. I for one would doubt that it could be demonstrated. Perhaps we could put it under the rubric of the promotion of mental health which in turn may have little or nothing to do with the prevention of mental illness. We must avoid swallowing everything that psychiatrists allege to be causal relationships. It is quite possible to find anything we wish for in the literature.

The foregoing comments tend to remove the discussion from the main point, which is that Professor Ojemann has attempted to do what is so rare, to test experimentally in a nonartificial situation the results of the alteration of what may be an important variable in day-to-day life.

We should be deeply grateful to him for this demonstration of what should and can be done.

Dr. Pasamanick is professor of psychiatry and director of psychiatric research, Ohio State University College of Medicine, Columbus, Ohio.

This paper was presented before the Mental Health Section of the American Public Health Association at the Eighty-Sixth Annual Meeting in St. Louis, Mo., October 28, 1958.

Grants for Malignant Tumor Control

Community Cancer Demonstration Project Grants are now available to nonprofit organizations and public health agencies. The Cancer Control Program of the Public Health Service administers the funds under the technical guidance of the director of the National Cancer Institute. The announcement describes the "types of projects believed to offer the best opportunities at this time for demonstrating better ways of providing community cancer control services," including education in cytology and cervical cancer screening projects, but "the types of projects suggested are not meant to exhaust all possibilities." Complete information from the Division of Special Health Services, Bureau of State Services, Public Health Service, Washington 25, D. C.

Medical data derived from birth certificates provide useful information. Here is a report on the collection and utilization of such data.

POTENTIALITIES AND LIMITATIONS OF MEDICAL DATA ON OFFICIAL BIRTH CERTIFICATES

Samuel Shwartz, M.D., F.A.P.H.A., and Howard West, M.P.H., F.A.P.H.A.

TO KEEP ABREAST of changes in the characteristics of a population with regard to pregnancies and newborns and to keep public health programs in this area geared to these changes, it is desirable and helpful to collect and study comprehensive statistics with which to measure and evaluate these changes and the program needs which they entail.

A simple and inexpensive method of collecting source data for such statistics is through the addition of a medical supplement to the birth certificate. Yet, this method has not gained intensive application because it has been found that the data so collected are often incomplete and inaccurate and because it has not been demonstrated convincingly that the data are of practical value for program purposes.

This paper describes our more recent experience in the District of Columbia with the collection of comprehensive data on a medical supplement and with the utilization of statistics derived therefrom. The experience to be reported is that of an urban community having some 33,000 live births a year.

A medical supplement to the birth certificate has been used in the District of Columbia since 1940. Little was done with this material until special resources became available for a comprehensive study of the 1952 birth certificate data. The methodology and findings of this study have been reported by Oppenheimer, et al.,[1] and the 1952 data used in this paper have been taken from that report.

Some time thereafter a biostatistician was added in the Department of Public Health and it became possible to proceed with a revision of the medical supplement and with the institution of other measures on a regular basis to improve the completeness and accuracy of reporting. Basic prerequisites to the feasibility of these activities were the close working relations between the Bureau of Maternal and Child Health and the Division of Biostatistics and the active participation and support of the local medical profession.* Given this cooperation, we have found that of the factors which are within the control of the public agency those that chiefly influence the completeness and accuracy of reporting are the amount and kind of information requested, the design and construction of the supplement and its individual items, and the measures taken to supervise and promote good reporting.

The amount of information that can be requested on the supplement is limited by consideration for the physician. Within this limit, a fair amount of

* A standing advisory committee of representatives of the obstetric and pediatric groups in the community participated in the revisions of the medical supplement and in promoting reporting thereon.

information can be requested if the supplement is designed and constructed to facilitate and expedite reporting. A copy of the birth certificate and the medical supplement developed and currently used in the District of Columbia may be secured by writing to the authors.* The supplement contains 18 items and experience has shown that generally not more than two to three minutes are required to complete these items. Attention is directed particularly to the check box design and to the fact that the supplemental items are appended on the face side of the certificate.

The items in this supplement are typical of the kind of information that can be collected. They are pertinent to pregnancy and its product. They deal with matters of local or national interest. They call for information which should be readily available to the physician. And for the most part they are conducive to complete and accurate reporting. Items on birth length, ophthalmic prophylaxis, and venereal disease, which were formerly included on this supplement, have been deleted because they are no longer of current interest. Items on anesthesia and analgesia have been deleted because the information was not meaningful without much more detail than could be reasonably requested on the supplement.

To supervise completeness of reporting periodic tabulations are made by hospital. Table 1 lists the significant findings of such a tabulation. The vertical columns with the most figures represent hospitals where the reporting was poor for a number of items and the horizontal lines with the most figures represent items which were reported poorly by most of the hospitals. The former calls for some corrective action at the individual hospital, the latter may call for some correction in the design and construction of the particular item.

A copy of this table, identifying the hospital, and an appropriate covering letter are sent to each hospital with the request that they be posted in the doctors' lounge and that they be discussed at the next monthly staff meeting. Follow-up field visits are made to those hospitals with poor reporting to review the reporting procedure within the hospital and to discuss improvements in the procedure.

* Bureau of Maternal and Child Health, Department of Public Health, 300 Indiana Ave., N.W., Washington 1, D. C.

Table 1—Per cent Incompleteness of Reporting by Hospital for Selected Items* on the Certificate of Live Birth: District of Columbia, January to June, 1958

Item	Hospital											
	1	2	3	4	5	6	7	8	9	10	11	12
First day of last menstrual period							44		14	12	27	
Erythroblastosis	90					15						
Other condition in infant	82					21					11	
Condition of pregnancy	43					28	18			15		
Onset of labor						13						
Duration of labor	88		96	13		30	15			46	27	
Complication of labor	90		77	12		43	19		91	12	16	

* Only deficiencies of 10 per cent or more are recorded.

Table 2—Changes in Per cent Completeness of Reporting for Selected Items on the Certificate of Live Birth 1952-1958: District of Columbia

Item	Per cent Completeness		
	1952 July-Dec.	1956 Jan.-Dec.	1958 Jan.-June
Period of gestation	99	*	*
First day of last menstrual period	*	89	92
Legitimacy	99	99	99
Birth weight	98	98	99
Congenital malformation	80	97	97
Birth injury			
Artificial respiration necessary	94	*	*
Unusual need for resuscitation	*	97	98
Cyanosis persisting	*	97	98
Prenatal care	92	98	99
Date of first prenatal visit	54	*	*
Approximate number of prenatal visits	*	98	†
Type of medical care	93	*	*
Attendant at delivery	*	97	99
Complication of pregnancy	59	94	87
Induction of labor	95	95	94
Duration of labor	83	†	71
Complication of labor	70	†	63
Method of delivery	98	97	98
Delivery of placenta	98	97	99

* Item not on certificate.
† Not tabulated for completeness of reporting.

The effectiveness of these measures is illustrated in Table 2, which compares the completeness of reporting for the years 1952, 1956, and 1958. It will be noted that there was considerable improvement in reporting in 1956 and 1958 for most items that were reported poorly in 1952. Two exceptions were the items, duration of labor, and complications of labor, for which the incompleteness of reporting was actually greater in 1958 than in 1952.

For selected items, such as birth weight and length of gestation, a query program is utilized to supervise the accuracy of reporting on individual certificates which may be suspect. A form letter is sent to the hospital of birth requesting recheck of the information. For more general supervision of the accuracy of reporting, the information reported in a representative sample of live-birth certificates is matched periodically with the same information reported in the corresponding hospital records as described by Oppenheimer, et al.[1]

Utilizing hospital record data and other information as a base of reference it was found that the accuracy of re-

porting was good for most of the items in 1956. Exceptions were the items, duration of labor, complications of labor, and conditions of pregnancy.

These items lack simple determinants and their reporting, therefore, is based on judgmental factors. Hence it appears inherent in the nature of this information that there will be substantial underreporting of abnormal categories. However, for the items, duration of labor and complications of labor, the underreporting of abnormal categories in 1956 was greater than in 1952 and must be attributed in large measure to the faulty construction of these items.

The item, conditions of pregnancy, illustrates how adequate construction can improve the accuracy of reporting of judgmental information. In 1952 the construction of this item was, "Complications of pregnancy? If any, describe." In 1956 the construction was changed with greater prominence and space given to this item, as well as detailed subcategories. The reported incidence of pregnancy complications in 1952 was 6 per cent and in 1956 it rose to 10 per cent. This is a significant improvement in accuracy of reporting even though the reported incidence in 1956 is still substantially below the 19 per cent incidence found in hospital records.

The improvement in accuracy of reporting is even more substantial when the construction is changed to call for a factual response instead of a judgmental response, as illustrated by the item on length of gestation. The item, weeks of gestation, in 1952 was changed in 1956 to, first day of last menstrual period. The reporting on these items is shown graphically in Figure 1. The more accurate reporting in the 1956 birth certificates is self evident.

Our work on the utilization of statistics derived from data reported on the medical supplement is of more recent origin and still largely exploratory. We have been investigating the potentialities and limitations in the use of these statistics to measure and evaluate the performance of the community as a whole with respect to pregnancy and the newborns, to measure and evaluate the performance of individual hospitals, and to study the epidemiology of unfavorable features of the pregnancy and newborn performance.

Tabulations of the information reported for each item on the medical supplement provide a more comprehensive and informative range of indexes than is provided by mortality data alone. Comparison of these indexes with similar data from other communities may be expected to help identify those features of the pregnancy and newborn performance which can be improved and which may well represent areas of unmet program needs.

In making comparative analyses of gross indexes, it is necessary to establish the validity of the data used for comparison. Data for any one year may reflect chance variation, as illustrated by the incidence of prematurity among white live births in the District of Columbia. In 1952 this incidence was found to be 8.3 per cent, which was higher than that reported from other areas. In 1956, incidence was found to be only 6.8 per cent. Data for additional years will be necessary to establish the representative incidence to be used as a basis for comparison.

Even if it should appear from additional data that the gross incidence of prematurity among white live births in the District of Columbia is comparatively high, further analysis would be necessary to ascertain the age and parity composition of the population groups being compared, before a valid interpretation of the comparison could be made.

Direct comparison of gross indexes for different years within the same community is on firmer ground and can be

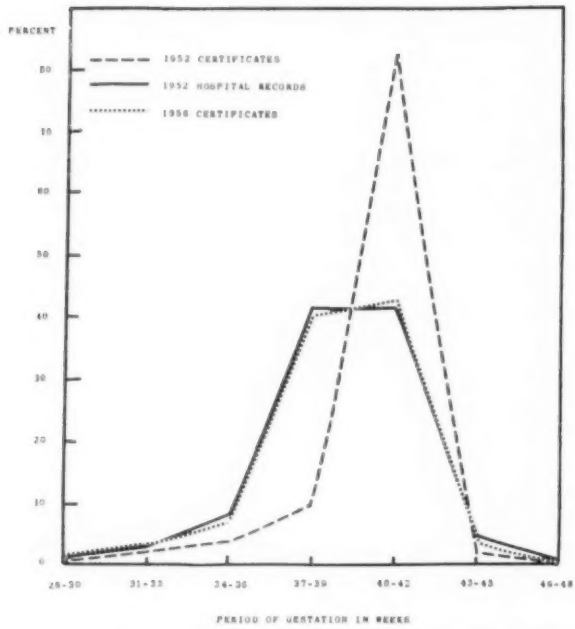

Figure 1—Live Births by Period of Gestation from 1952 Certificates of Live Birth, 1952 Hospital Records, and 1956 Certificates of Live Birth: District of Columbia

used to evaluate program activities within a particular index area. In the District of Columbia, for example, neighborhood prenatal clinics were discontinued at the end of 1952 because of budgetary cuts. The birth certificate data showed that, whereas 6 per cent of mothers of live births received no prenatal care in 1952, the proportion had increased to 11 per cent by 1956.

Appropriate cross-tabulations can be used to identify the population group not receiving these services. Such tabulations showed that the lack of prenatal care was greatest for the nonwhites, and among the nonwhites it was greatest for the medically indigent, of whom some 45 per cent received no prenatal care, even though it was available to them at the municipal hospital. This finding was not anticipated and its objective demonstration was a strong factor in the reactivation of some neighborhood services. Data for subsequent years will demonstrate whether the provision of these services does indeed reverse the trend of increasing lack of prenatal care.

Comparative study of gross indexes at individual hospitals to measure and evaluate the performance of each hospital has thus far been limited to neonatal death rates and rates for certain obstetric procedures, as shown in Table 3.

At first glance the gross neonatal mortality rates would appear to give some measure of individual hospital performances. Yet, when neonatal death certificates were matched with live-birth certificates for detailed study of rates

by race and birth weight, there appeared to be no significant differences between hospitals. We use the phrase "appeared to be" advisedly. The number of neonatal deaths in the over-all was 690, and when subdivided by hospital, race, and weight group the small numbers obtained lacked statistical significance. Mortality data combined for a two- or three-year period will provide a better basis for analysis.

The gross rates for selected obstetric procedures would also appear to have potentialities for measuring specific aspects of individual hospital performances. One such procedure, induced labor, which has widely varying rates among hospitals, is associated with a higher neonatal mortality rate than spontaneous labor (Table 4). However, other factors may well explain these differences in rates. Thus, the comparative incidence of such factors as race and coexisting pregnancy conditions would have to be analyzed before valid comparisons among hospitals could be made. Along with more detailed analysis, data for several more years will be needed to establish a firm basis for utilizing these and other statistics to measure individual hospital performance.

More positive findings have come from our studies on the epidemiology of unfavorable features with respect to pregnancy and newborns. Table 4 shows the results of a differential analysis of neonatal death rates in terms of antecedent pregnancy factors. The data are derived from matched live-birth and neonatal death certificates; and since the items listed in this table are not mutually exclusive, there is considerable overlapping of the data.

Attention is directed to the item, no prenatal care, in Section C of the table. Neighborhood prenatal clinics were dis-

Table 3—Comparison of Selected Events by Hospital: District of Columbia, 1956

Hospital Code Number	Neonatal Death Rate* for Hospital of Birth	Per cent Induction Labor	Per cent Cesarian Section	Per cent Manual Removal Placenta
All Live-Births	20.8	7.7	3.6	6.9
01	11.4	3.2	0.1	2.2
06	16.4	9.5	4.6	5.9
07	31.6	3.1	4.0	8.8
08	12.5	14.6	5.2	5.0
11	27.7	2.1	2.2	4.1
12	18.6	8.8	5.1	9.0
13	19.9	14.5	3.2	7.3
14	15.3	5.5	5.8	13.4
15	37.0	6.2	1.7	4.1
17	00.0	19.5	4.1	2.5
19	17.3	1.8	2.2	3.7
21	14.5	7.8	2.2	3.8
22	18.9	1.9	0.5	9.5
24	17.1	3.0	1.5	4.3

* Per 1,000 live births.

Table 4—Incidence of Selected Items Among Live Births and Matched Neonatal Deaths; and Their Neonatal Death Rates: District of Columbia, 1956

(The top line of this table gives the neonatal mortality rate for all live births. Each line thereafter lists a particular characteristic of pregnancy, giving for each first the percentage of all live births having this characteristic, second the percentage of all neonatal deaths having this characteristic, and third the neonatal death rate for live births having this characterisic.)

Item		Per cent of Live Births	Per cent of Neonatal Deaths	Neonatal Death Rate
All Live Births				20.8
A. Mother	1. Age under 20	11.7	17.2	30.8
	2. Fifth parity and over	13.7	17.3	26.3
	3. Previous fetal loss	3.9	9.1	49.0
B. Pregnancy	1. "Illegitimate"	12.5	20.5	34.1
	2. Pregnancy complication	9.7	41.1	98.6
	3. Labor complication	2.4	13.3	115.9
	4. Gestation under 37 weeks	13.4	71.3	108.5
C. Medical	1. No prenatal care	11.2	26.2	48.8
	2. Hospital staff care	42.6	53.3	26.1
	3. Induction of labor	7.0	11.4	34.1
	4. Cesarian Section	3.5	7.4	44.0
	5. Breech extraction	2.1	9.9	97.8
D. Infant	1. Birth weight under 2,501 grams	9.5	76.1	167.0

continued in the District of Columbia and there was an increase in the number of women receiving no prenatal care. This increase in itself would not be significant unless it could be shown to have contributed to a poorer pregnancy and newborn performance. Table 4 shows that this was actually so. The neonatal mortality for live births to mothers who had received no prenatal care was almost two and one-half times as great as that for all live births. 48.8 as compared to 20.8.

Given this association between lack of prenatal care and neonatal mortality, the question naturally arises whether the association is a direct relationship or one mediated through some other factor, such as low socioeconomic status. To determine this, we analyzed the birth certificate data on some 5,800 live births at the municipal hospital in 1956. Obstetric care at this hospital is restricted to the medically indigent, the upper income limit for a family of ten being $330 per month. Approximately half of the mothers of these live births received some prenatal care and approximately half received no prenatal care. The neonatal mortality rate for those receiving no prenatal care was still two and one-half times as great as that for those receiving some prenatal care. Moreover, the neonatal mortality rates for each of these groups at the municipal hospital were somewhat lower than those for the corresponding groups among all live births. Clearly, low

socioeconomic status played no role in the association between lack of prenatal care and neonatal mortality. Even more significant, it played no direct role whatsoever in neonatal mortality.

Another factor studied in this relationship between lack of prenatal care and neonatal mortality was the role played by complications of pregnancy. It was found that, whereas complications of pregnancy were reported in 41 per cent of all mothers of neonatal deaths, among mothers who had no prenatal care and whose infants succumbed as neonatal deaths only 23 per cent were reported to have complications of pregnancy. Thus, complications of pregnancy were a subordinate factor in the relationship between lack of prenatal care and neonatal mortality. This clear-cut demonstration of the intrinsic value of prenatal care highlights the importance of providing prenatal care to all pregnant women.

Neonatal death is but one of the unfavorable features of the performance relating to pregnancy and newborns. Other unfavorable features and their relation to antecedent pregnancy factors can be studied in the same manner. A study on the epidemiology of prematurity has been reported previously.[1] In this latter connection it may be pertinent to point out that our 1956 data show that among neonatal deaths whose mothers had no prenatal care over 80 per cent had birth weights under 2,501 grams. Thus, prematurity was the major pathway to death for infants whose mothers received no prenatal care.

Real progress has been made in defining the type of information for which complete and accurate reporting can be obtained and in defining the measures that will produce reliable reporting. Much remains to be learned about the manner in which statistics derived from these data can best be utilized for program purposes. We hope that this report of our experience will stimulate similar activities in other areas not now engaged in such activities.

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Dr. Shwartz is chief, Community Standards Division, and Mr West is chief, Biostatistics and Health Education Division, Department of Public Health, Washington, D. C.

This paper was presented before a Joint Session of the Maternal and Child Health and Statistics Sections of the American Public Health Association at the Eighty-Sixth Annual Meeting in St. Louis, Mo., October 28, 1958.

The status of air pollution in the United States is reviewed in terms of knowledge available and action taken to deal with this problem. Studies by the National Air Sampling Network, state, and local health agencies are reviewed. Facilities for training persons for air pollution work are discussed, and the Federal Air Pollution Engineering Research and Technical Assistance Program is surveyed.

PRESENT STATUS OF ATMOSPHERIC POLLUTION IN THE UNITED STATES

Arthur C. Stern, M.E., F.A.P.H.A.

THIS IS THE THIRD of a series of status reports on air pollution. There was a hiatus of six years between the first two,[1,2] then a pause of only two years until this one. The volume of material to report has now become too great to compress into one paper. As a result, this status report was prepared in two sections; this one, covering operating and administrative developments, and a companion paper by Dr. Moyer Thomas[3] covering research developments.

How Polluted Is the Air?

Our ability to answer the question, How polluted is the air?, results mainly from the fact that the National Air Sampling Network has since January 1, 1957, been truly "national," with operative sampling stations in all states and territories. It is also truly "national" in another sense, in that all stations are operated by state or local agencies, in most instances health departments. The urban portion of the network consists of 112 cities, sampled every year (these include the largest city in each state plus additional large cities in a number of states); 38 somewhat smaller cities, half of which are sampled in even years, half in odd years; and 81 still smaller cities, one-third of which are sampled each year. The nonurban portion consists of one site in each state chosen to give background levels against which to compare the urban samples.

The network uses only one sampling site in each city, almost always the roof of a low "downtown" building. Sampling dates are statistically randomized but are intended to produce about 26 samples per year per site at about biweekly intervals. Each sampling period is of 24 hours' duration. A variety of analyses are made according to a master plan, not all samples receiving all analyses. The results of the analysis of the approximately 10,000 network particulate matter samples collected prior to 1958 has been published.[4] As would be expected, they show in the gross picture for the nation as a whole (Figure 1) that urban areas are about five times as polluted as nonurban areas.

For most communities the only type of data recorded for a sufficient number

of years to permit determinations of annual trend is monthly weight of settleable solids. This has shown a downward trend (Figure 2) reflecting the change in the type of sources of air pollution from the grit producing sources of thirty years ago to the nongritty types which are of major concern today.

Gaseous Pollutants

Since in air pollution matters the eyes of the nation have been focused on Los Angeles, a picture of what has been happening to the air of that metropolis is of interest. The daily record of oxidant level in Pasadena over the last six years[5] as recorded by Dr. Haagen-Smit (Figure 3) shows an encouraging, improving trend, through the first five years with some retrogression in 1958.

Although many measurements of pollutant concentrations have been made in this country, until recently the publications reporting them were scattered and diverse so that it was difficult to get a comprehensive view of their extent and meaning. Two recent publications[6,7] have served to bring together most of this information. Table 1 from one of them[7] covers a group of pollutants not accounted for by the network particulate analyses already discussed.

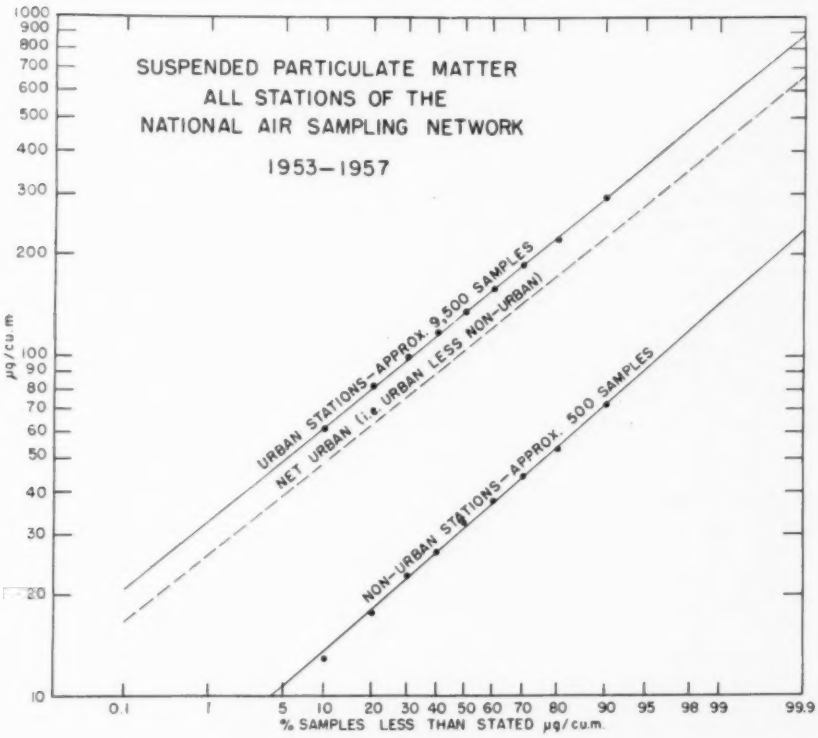


Figure 1

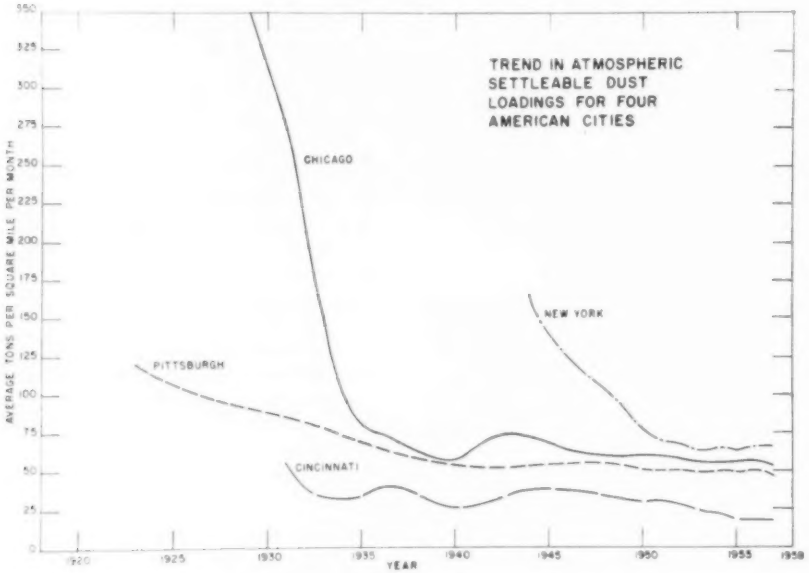


Figure 2

State and Local Studies

In those states in which state air pollution control agencies have been created, there has been recent activity in setting up state-wide air sampling networks with more intensive coverage than is afforded by the National Air Sampling Network. California reports the results of its network in its publication "Clean Air Quarterly."[5] There has, as yet, been no formal publication of the results being obtained by Massachusetts, Maryland, New York, Oregon, and Washington. The New Jersey Health Department has published air quality ratings of the cities being monitored in that state.[8] It is noteworthy that the cities which received poor ratings did not react with wrath against the health department. Rather local civic groups, press, and official agencies adopted the theme that conditions needed improvement and that something should be done about it.

During the past year several local areas have completed searching self-appraisals of the quality of their atmosphere, the most noteworthy of these being in Honolulu,[9] Houston,[10] and Louisville.[11] All these studies related observed air quality with the associated wind and weather conditions in an effort to explain the results.

One of the principal findings of the state-wide appraisals of air pollution completed during the past two years in Connecticut,[12] Tennessee,[13] Texas,[14] and Washington[15] has been the paucity of air quality data upon which to base conclusions. In these state studies and in similar community studies conducted in Birmingham,[16] Denver,[17] Portland,[18] and Steubenville,[19] conclusions as to the extent and critical nature of problems had to be drawn from subjective evaluations and circumstantial evidence, rather than from objective measurements of the atmosphere itself.

Automatic Instrumentation

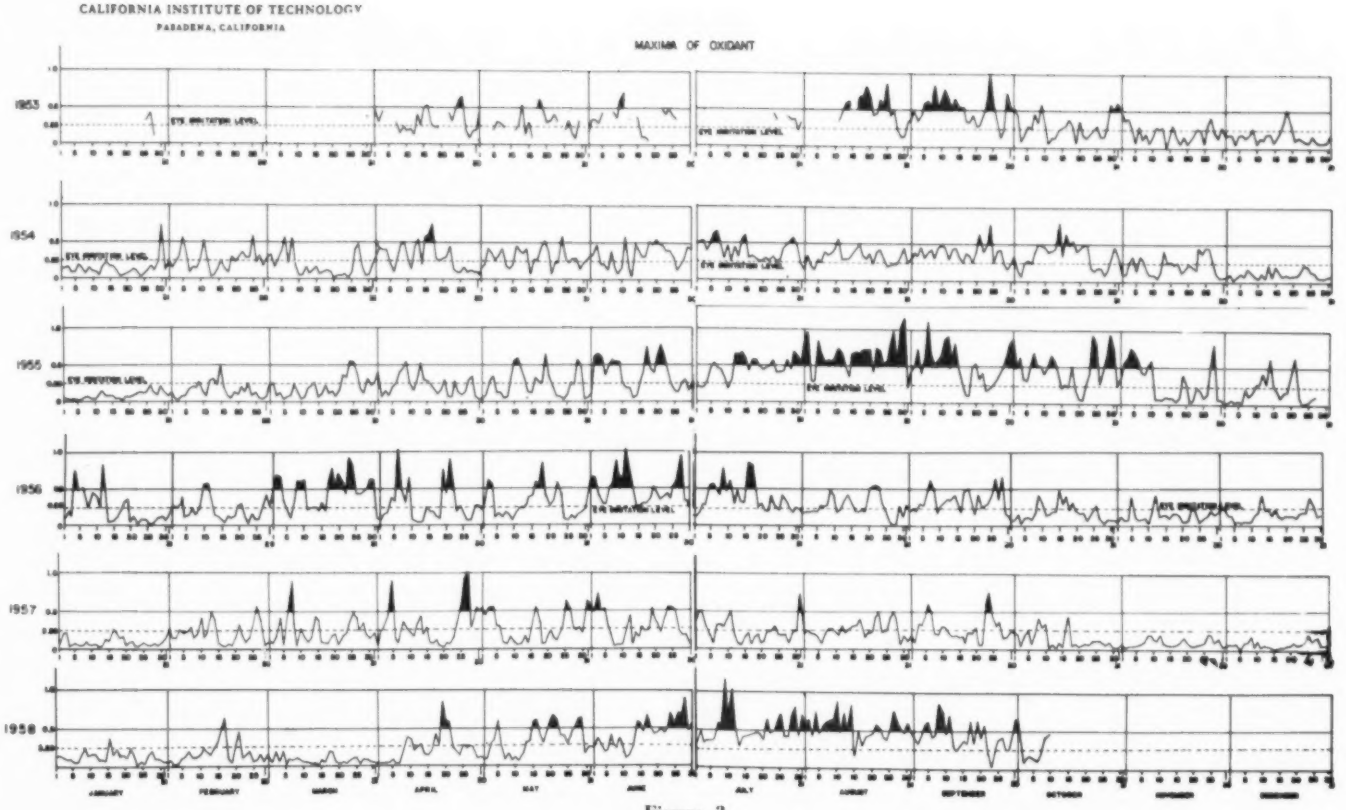
In a study made by New York University[20] as a precursor to the formation of the New York State Air Pollution Control Board, it was found at that time that outside of New York City, no public agency in New York State owned even one automatic instrument for continuous monitoring of the atmosphere. A recent check with manufacturers of automatic instruments for monitoring pollutant gases in the atmosphere shows that at present approximately 48 are owned by industrial organizations and are used for self-monitoring purposes, and approximately 100 are owned by public agencies in California. Only ten are in the hands of public agencies in the rest of the nation. It is obvious from this that state and local health agencies are ignoring measurement of the gaseous pollution that will most likely be of great public health concern in the future. Measurement methods and instruments currently available are far from ideal. Much work needs to be done to develop more specific and sensitive measurements and more simple, and less costly instruments. However, the major failure to date has been inadequate application of available methods and equipment.

Air Quality Data Center and Analytical Reference Service

As one step toward improving the availability of existing air quality data the Public Health Service has set up at the Robert A. Taft Sanitary Engineering Center an Air Quality Data Center to serve as a place to which such local data may be funneled for processing, analysis, and publication. The Service, also through the Center, has initiated an Analytical Reference Service whereby replicate air pollution samples are provided to a group of air pollution laboratories in order that the several laboratories may compare their analyses with those of the other cooperating laboratories. Most of what we know about the effects of air pollution is not of recent origin. Since it may be found in earlier reviews[1,2] it will not be repeated here. That which has but recently been learned will be found in the companion paper to this one.[3]

Training of Air Pollution Personnel

A larger number of people than ever before are being trained in the technics of air pollution control and of research. In 1958, special short courses of one or two weeks' duration were offered at New York University, Columbia University, Massachusetts Institute of Technology, University of Minnesota, University of California (Berkeley), University of North Carolina, and Rutgers University. Air pollution courses may now be elected at 14 schools (Table 2) for credit for undergraduate engineering degrees or graduate degrees in engineering or public health. The Air Pollution Training Section of the Robert A. Taft Sanitary Engineering Center conducted field courses for the first time in 1958. This was in addition to those courses regularly offered at the center in Cincinnati. Each of these field courses had local sponsorship by a state or local health department. The total attendance at field courses during fiscal year 1958 was 742, as compared with 162 persons who came to the center for specialized air pollution training courses. It is of interest to note that in fiscal year 1957, the percentage of enrollees from health or control groups and industry were 46 per cent and 24 per cent, respectively; in fiscal year 1958 these percentages were 32 per cent and 34 per cent, respectively. Since inauguration of the program three years ago, there were 884 enrollees who have been trained in residence courses.


CALIFORNIA INSTITUTE OF TECHNOLOGY
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SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

Figure 3

Table 1—Variation of Measured Average Gaseous Air Pollutant Concentration with Size of Metropolitan Area (ppm by vol)

	Population Range					
	Greater than 2,000,000		500,000 to 2,000,000		Less than 500,000	
Component	Average Concentration	Concentration Range	Average Concentration	Concentration Range	Average Concentration	Concentration Range
Sulfur dioxide	0.15	0.01–0.48	0.05	0.02 – 0.09	0.04	0.01 –0.17
Hydrogen sulfide	0.10†	—	—	—	0.01†	—
Nitrogen oxide, as NO_2	0.48	0.1 –0.9	0.22	0.21 – 0.23	0.14	0.12 –0.15
Ammonia	0.11	0.01–0.22	0.02	—	0.03†	—
Aldehydes, as HCHO	0.24	0.20–0.28†	0.07	0.07	0.04†	—
Hydrocarbons	0.29†	0.2 –0.38	—	—	—	—
Chlorine	0.09†	0.08–0.10	0.04	0.03 – 0.04	0.05†	0.03 –0.07
Carbon monoxide	3.4†	2.0 –4.8	8.3†	6.5 –10.0	5†	—
Ozone	0.07	0.02–0.21	0.03	0.03 – 0.04	0.03	0.01 –0.05
Hydrogen fluoride	0.008†	—	0.006	0.001– 0.013	0.005†	0.003–0.007
Carbon dioxide	330†	—	370†	—	—	—

Variation of Measured Average Maximum Gaseous Air Pollutant Concentration with Size of Metropolitan Area (ppm by vol)

	Population Range					
	Greater than 2,000,000		500,000 to 2,000,000		Less than 500,000	
Component	Average Concentration	Concentration Range	Average Concentration	Concentration Range	Average Concentration	Concentration Range
Sulfur dioxide	0.72	0.12–1.5	0.36	0.09 – 0.75	0.21	0.02 –0.8
Hydrogen sulfide	0.61†	—	—	—	—	—
Nitrogen oxide, as NO_2	2.05†	0.61–3.5	0.62	0.55 – 0.67	0.50	0.3 –0.63
Ammonia	1.6†	0.2 –3.1	0.07	0.05 – 0.09	0.16†	0.12 –0.21
Aldehydes, as HCHO	0.89†	0.85–0.92	0.70†	0.12 – 1.8	0.37	0.13 –0.6
Hydrocarbons	1.10†	0.15–3.0	1.39†	—	—	—
Chlorine	0.38†	0.15–0.62	0.13†	0.11 – 0.15	0.13	0.03 –0.3
Carbon monoxide	109	3–300	19	3 –38	1.2†	—
Ozone	0.17	0.05–0.33	0.08	0.08	0.15	0.03 –0.33
Hydrogen fluoride	0.027†	—	0.027	0.005– 0.05	0.031†	0.030–0.032
Carbon dioxide	980	370–2700	460	400–530	430	—

† Less than three cities reported in "average."

Table 2—Schools Offering Air Pollution Courses for Academic Credit

University	School or Department: Public Health	Engineering	Other	Degree*
California	X	X		M.P.H., M.S., Ph.D.
Cincinnati		X	Ind. Health	M.I.H., M.S.
Columbia			Sanit. Science	M. Sanit. Sci.
Florida		X		M.S., Ph.D.
Georgia Tech.		X		M.S., Ph.D.
Harvard	X		Arts and Sci.	M.P.H., Ph.D., Sc.D.
Michigan	X			M.P.H., M.S., Ph.D.
Minnesota	X	X		M.P.H., M.S., Ph.D.
M. I. T.		X		M.S., Ph.D.
New York		X		M.S., Ph.D.
North Carolina	X			M.P.H., Ph.D.
Pittsburgh	X	X		M.P.H., M.S., Ph.D.
Rutgers		X	Sanitation	M.S., Ph.D.
Washington		X		M.S., Ph.D.

* Degree in accredited school with air pollution option or emphasis.

National Conference on Air Pollution

Public health workers have been made and kept aware of developments in air pollution by courses such as these, the excellent forums and publications for the exchange of technical information offered by the American Public Health Association, Air Pollution Control Association, American Industrial Hygiene Association, American Chemical Society, American Meteorological Association, American Society of Agronomy and the several engineering societies, and by the now merged abstracting services heretofore separately offered by the Air Pollution Control Association and the Library of Congress. Unfortunately too much of this effort has been introspective with the same groups of professional workers meeting with and talking with each other with "different hats on." There have been several recent developments to counter this trend by opening channels of communication between the professionals in the field and the public. In this country the most important move has been the calling by the Surgeon General of the Public Health Service of the National Conference on Air Pollution, held in Washington, D. C., November 18-20, 1958.

In this same context, note should be made of the action of the 1957 Governors' Conference in calling on the Council of State Governments to prepare a report on the air pollution problem for the guidance of the several state governments. The report, published in 1958,[21] discusses the various types of air pollution legislation available for state adoption. Recommendation of the establishment of state air pollution technical assistance and research agencies is made in the revised edition of the Manufacturing Chemists Association publication, "A Rational Approach to Air Pollution Legislation."[22] That recommendations to this end are being

heeded is evidenced by the 9 new state names added since 1956 to the roster of those which have adopted state air pollution legislation (Table 3).

Air Basins

At the community level the most significant developments are those which are attempting to meet the problem of air basins which involve more than one political jurisdiction. Several years ago California and Kentucky allowed their counties to take air pollution jurisdiction from the cities and incorporated areas therein. More recently California has allowed contiguous county groups to supersede individual counties in this regard. The Bay Area Air Pollution Control District, which includes six counties around San Francisco Bay, was set up under this enabling act. In Massachusetts, air pollution jurisdictions over the numerous cities and towns comprising Greater Boston was several years ago transferred to the State Health Department. In Hamilton County, Ohio, a group of smaller cities in Greater Cincinnati have contracted with the city of Cincinnati for air pollution inspection and engineering services in an effort to make enforcement uniform throughout the area.

A more complex situation arises where the air basin involves more than one state, as it does in 23 of the 174 standard metropolitan areas of the continental United States. Quite differ-

Table 3—New State Air Pollution Legislation Since 1956

State	Agency Receiving Authority	Authority Added to Agency
California	Air Pollution Control Districts	To enforce vehicle code relating to emission of air contaminants and to establish standards for equipment for installation on motor vehicles to control such emissions and to prohibit the sale of same.
Colorado	Department of Public Health	To establish standards for discharge of toxic materials to the atmosphere.
Delaware	Board of Health	To create State Air Pollution Authority.
Florida	Board of Health	To create State Air Pollution Control Commission.
Hawaii	Board of Health	To establish section on Air Pollution Control and promulgate rules and regulations.
Minnesota	Board of Health	To make regulations for the control of atmospheric pollution deterimental to public health.
Nevada	Counties and Cities	Individually and by cooperative agreements with each other to regulate air pollution.
New Jersey	Interstate Sanitation Commission	To extend period of final report on New York-New Jersey air pollution study to beyond 1957.
New York	Interstate Sanitation Commission	To study interstate (New York-New Jersey) air pollution and prepare report.
New York	Department of Health	To create State Air Pollution Control Board.
Ohio	Department of Health	To study air pollution and assist communities.
Washington	Counties and Cities	To create air pollution control districts and receive assistance from State Department of Health.

ent actions have been taken by three such areas. In the New York Harbor area, the states of New York and New Jersey (with the consent of Congress and of the state of Connecticut) directed an existing tristate agency, the Interstate Sanitation Commission, to report on the interstate flow of pollution in that area and to make appropriate recommendations for its control. The first report of the commission to the legislatures[23] noted that some form of bistate control is needed but requested an extension until 1959 before recommending the methods by which this should be accomplished. In the upper Ohio River Valley area involving cities in Ohio and West Virginia, an Upper Ohio River Valley Air Pollution Control Council has been incorporated and is setting the stage for an attack on the problem in which the several jurisdictions in the two states while retaining their independence pool their resources on a voluntary basis.

Early in October, 1958, the Canadian and United States sections of the Technical Advisory Board on Air Pollution submitted to the International Joint Commission their final report on air pollution along the Detroit River between Detroit and Windsor. Although taking cognizance of the excellent voluntary program for the control of vessel smoke in the Detroit River by members of the Dominion Marine Association and the Lake Carriers Association, the boards have recommended to the commission that an international legal mechanism must be employed to control those vessels which have not voluntarily complied with the smoke emission standards of Detroit and Windsor.

Standardization of Test Methods

Although both the Canadian and British Standards Associations have undertaken to establish air pollution standards, primarily concerned at the present with test methods, there has been no similar move in this country using the American Standards Association. The closest approach has been the work of the American Society for Testing Materials D-22 committee in adopting and publishing several air pollution test methods.[24] A standard method for settled dust measurement has been adopted by the Air Pollution Control Association.[25] Since appropriate committees of the American Public Health Association and of other organizations also are active in this area, the time is ripe for a coordination of these efforts.

On the world scene, the World Health Organization created an expert committee on air pollution which met in Geneva in 1957 and has in press a monograph on air pollution as a guide to its member nations. This committee reported to the WHO meeting in Minneapolis.[26]

Federal Research and Technical Assistance Program

Up to this point this status report has refrained from a detailed discussion of the air pollution research program of the federal government. This has not been for the purpose of deemphasizing this program, but rather to avoid overlap of this report with the companion report on air pollution research findings previously noted. The Federal Air Pollution Research and Technical Assistance Act (Public Law 159-84th Congress) is now three years old. In the first year, Congress appropriated one and a half million dollars to support air pollution activities; three million dollars the second year; four million dollars the third year, and the same for the fiscal year that ends July, 1959. In each of these years, approximately 80 per cent of the funds went into research, the remainder into technical assistance to states and communities. The research funds have been allocated

so that almost equal thirds have gone to support (1) research by universities and other nonfederal groups, (2) research by the Public Health Service, and (3) research by other federal agencies; viz: Weather Bureau, Bureau of Mines, Department of Agriculture, Bureau of Standards, and the Tennessee Valley Authority. Over-all, 40 per cent of all research funds has been devoted to studies on the effect of air pollution on human health; 60 per cent to all other aspects of the problem, i.e., finding out what is in the air, where it comes from, how it reacts, where it goes, how it may be controlled and what it does to crops, livestock, weather, visibility, materials, structures, and so forth. Most of the Public Health Service's own research program is being conducted at the Taft Sanitary Engineering Center and the Occupational Health Field Headquarters, both in Cincinnati, Ohio. If one area of research can be singled out as receiving more emphasis than any other, it is the automobile engine as a source of air pollution. Intensive studies seeking to elucidate its role more thoroughly and to develop reasonably applicable remedies are in progress.

Conclusion

Certainly the factors productive of air pollution continue to grow, namely: population, urbanization, industrialization, and transportation. At present, they appear to be growing at a more rapid rate than the knowledge and application of controls on pollutant emission to the atmosphere. Since the weather still remains the same, there will, in all major metropolitan areas of the country, continue to be days of "good" weather when, no matter how much pollution is dumped into the atmosphere, it will be diluted to levels that do not disturb us. However, in these same communities, it can safely be predicted that during the days of "bad" weather, when dilution is inefficient, pollution in most will, for some time to come, get worse rather than better. The tide will turn when the research answers as yet not found are applied in every state in the nation by air pollution control agencies, most of these as yet unfounded.

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This paper was presented before a Joint Session of the Conference of Municipal Public Health Engineers, Conference of State Sanitary Engineers, and the Engineering and Sanitation, Health Officers, and Occupational Health Sections of the American Public Health Association at the Eighty-Sixth Annual Meeting in St. Louis, Mo., October 29, 1958.

Advancing Nursing Education

The Public Health Service reports that a total of 3,803 professional nurses received federal traineeship aid during the past three years for advanced preparation in administrative, supervisory, and teaching positions. In July, 1959, the program was extended for an additional five years.

Slightly more than half of the trainees in each year were preparing for teaching positions, both in schools of professional nursing and schools of practical nursing. About one-fourth were studying for positions in administration, and one-fourth for supervisory posts. Nurse trainees came from every state in the Union, and from Puerto Rico.

Eighty-six schools of nursing and public health are now awarding traineeships.

A major community problem with serious implications for public health work is urban growth through dispersal. Here is an acute analysis of this important social problem which raises provocative questions.

IMPACT OF URBAN SPRAWL ON HOUSING AND COMMUNITY DEVELOPMENT

Coleman Woodbury, Ph.D.

MY SUBJECT might be called—Some Effects of Current Urban Dispersal on Housing and Community Development. "Urban sprawl" seems to me a loaded term, not likely to further the thoughtful and reasonably dispassionate analysis that the subject calls for. After all, who could possibly find any merits, however minor and however much outweighed by problems and shortcomings, in a phenomenon labeled "sprawl"—a term redolent of clumsiness, immaturity, and ridiculousness. Although current urban growth leaves very much to be desired and, in my opinion, poses some of the crucial issues of our society, it deserves more than polite name calling.

The term, urban sprawl, is coming into fairly common use because it tags one of the principal characteristics of current urban growth in all sections of this country and in nearly all sizable urban centers: the more or less planless extension of urban building on and on into the countryside with little or no attention to community facilities and services, topography, future transit and transport problems, and similar matters. Before taking up briefly some of the problems this kind of growth entails, we should recall a few related characteristics of the current urban scene.

Characteristics of Urban Growth

First, this country is now undergoing a strong and apparently increasing urbanization. According to estimates of the Bureau of the Census,[1] approximately 95 per cent of the population increase of this country from 1950 to 1956 was accounted for by the 168 standard metropolitan areas marked out by the Census in 1950 plus urban places outside metropolitan areas. Not all metropolitan residents are urban, by Census definitions. In fact, in 1956 some 2.3 million persons in metropolitan areas were living on farms and some 14.7 million were in the rural nonfarm category. From the definition of standard metropolitan areas, however, it seems fair to say that a large proportion of these technically nonurban metropolites are quite surely urban in employment, orientation, and ways of life. If we accept this extension of urban, national population growth today is almost entirely urban growth.

By the same Census estimates, nearly 85 per cent of the 1950 to 1956 national population increase was accounted for by the 168 standard metropolitan areas of 1950. (Some half dozen have been added since 1950.) Only in lesser degree, then, is national population growth predominantly metropolitan growth.

We may break down metropolitan areas into three subareas: (1) central cities; (2) suburbs (urban fringe in Census terms)—the more or less densely built up areas, incorporated and unincorporated, outside the central cities; and (3) rural-urban fringes—the remainder of the metropolitan areas—i.e., outside of both central cities and suburbs. How about population growth in these subareas? For the same period, the central cities had 15.6 per cent of the national population increase; the suburbs—27.2 per cent; the rural-urban fringes—41.5 per cent.[2] In other words, over a recent six-year period of rapid population increase, more than two-thirds (68.7 per cent) of the national increase went into metropolitan areas outside their central cities and more than two-fifths (41.5 per cent) into metropolitan areas outside of both central cities and suburbs.

Here is unmistakable evidence of what Luther Gulick first called a "new pattern of settlement" that marks mid-twentieth century urbanization. Note, too, that almost by definition nearly all of the rural-urban fringes and, in fact, many of the suburbs are poorly prepared—in governmental structure and finances, in customs and tradition, in civic organization, even in prevailing attitudes—to take care of this flood of in-migrants and their needs.

Another significant fact is that, unlike the more sedate suburban movement of earlier decades, this headlong spreading out of urban population is accompanied by a major dispersal of many commercial and service activities, particularly retailing, and by a less marked diffusion of industrial employment. Just one bit of evidence here: In a recently published study,[3] Murray D. Dessel in the Office of Area Development of the Department of Commerce compared retail store sales in 45 metropolitan areas for 1948 and 1954. Over this six-year period the dollar value of retail sales for the United States increased by 30.8 per cent. For the 45 metropolitan areas the corresponding figure was 32.3 per cent—not far from the national increase. For the central business districts in the central cities of these same metropolitan areas, however, the increase was only 1.6 per cent, which, taking account of the rise in price levels during this period, quite clearly indicates a decline in the volume of goods sold in the "downtowns" of these areas. The burgeoning, outlying shopping centers and established, suburban retail areas are increasing their proportion of total sales.

This dispersal or diffusion of residential and other urban land uses is, of course, no simple phenomenon. The trends just mentioned are the net consequences of many shifts or movements of population into, out of and within metropolitan areas. We do not know much about some of these shifts, and undoubtedly they vary considerably among metropolitan localities. In broad perspective, however, one other characteristic of urban growth is highly significant for our purposes: as among the three major subareas current growth is selective. It is concentrating a large proportion of the recent migrants to metropolitan areas in the central cities. Most of these newcomers are poor, unskilled in urban vocations and in the manners of urban living, and many of them are Negroes and Puerto Ricans. The central cities are coming more and more to fit the phrase first applied, I believe, to New York City: the home of the rich, the poor, and the childless. The old image of the suburbs as predominantly bedroom towns of the wealthy and well-to-do is no longer valid. More and more suburbanites are now in the middle and lower middle income ranges. Some students of the metropolitan scene predict that before long many suburbs will be receiving an increasing proportion of the low-income

in-migrants. Today's suburban populations have a disproportionate share of young families with children. One recent study of nearly 400 suburban communities of 10,000 and more showed that only 46 per cent of them were, by one method of measurement, essentially dormitory towns.[4] Heterogeneity seems to be the chief characteristic of the rural-urban fringes. Their populations range from the very wealthy to the very poor. They include refugees from central cities and the older suburbs, often a sizable indigenous population, and, in at least some fringes, a substantial number of recent migrants from rural and small town localities.

These, then, in broadest outline, are some of the principal characteristics of current urban-metropolitan growth. It is a rapid, almost headlong growth heavily concentrated in the fringe and suburban subareas of metropolitan localities. It is producing a dispersed, land-devouring pattern of settlement, which in many respects deserves to be called "urban sprawl." Although many of the most dramatic features of this development are residential, it is not limited to this kind of land use. From the point of view of public policy, the dispersal, itself, is not more significant than the selective or sorting out process that is changing markedly the population characteristics of central cities, suburbs, and fringes, alike. This process is not only confronting each of the major subareas with thorny problems, but it seems also to be aggravating the difficulties of communication among them and throwing additional strains on the never very robust sense of community in most metropolitan areas.

At least one other question should be noted before we turn to the effects of dispersal on housing and community development: Is urban growth likely to continue strongly for the next 15 or 20 years, or is it a short-term phenomenon linked to conditions subsequent to World War II that seem likely to change in the near future? I have tried to answer this question elsewhere at greater length than is possible in this paper.[5] I state here only my general conclusion. Assuming that we can avoid a catastrophic war and a serious, long sustained economic depression, rapid urban growth seems likely to continue into the foreseeable future.

Some of Its Problems

I shall now identify seven problems that urban growth and dispersal are forcing on the attention of thoughtful persons concerned with the future of housing and local community development.

Central City Services and Redevelopment—What I have called the selective character of current metropolitan growth is reducing, relatively, the per capita tax-paying capacity in central cities. This follows from the concentration of low-income in-migrants and from the relative decrease and slower growth of some economic activities in these subareas. At the same time most central cities face needs for more and better services for their changing populations, for example, in health protection, housing, recreation, police, welfare services, even in schools. In addition, nearly all central cities are up against the need for major redevelopment or renewal. If such action is to be effective, it must soon graduate from its present experimental stage to a full-scale offensive against blight and deterioration. This will be an expensive program. In broad outlines, the situation is painfully clear: weakening local tax bases; actual and impending needs for more services and expenditures.

Slums of the Future—Almost 70 per cent of the total population increase of this country and nearly 82 per cent of the metropolitan increase are

accounted for currently by the suburban and rural-urban fringe areas. No wonder we have been having a speculative housing boom. But what proportion of this outlying metropolitan growth has taken place under reasonably adequate codes competently enforced? How much of it will have the continuing benefit of good codes dealing with maintenance, repair, and occupancy? No one, I believe, knows the answers to these questions, but almost every observant person interested in such matters knows of many large and growing areas in which the absence of adequate code standards is only too evident. Here, in too many parts of suburban and fringe areas, we are building some of the blighted and slum areas of the future.

I do not wish to single out any metropolitan area as a horrible example. It would not be fair. Recently, however, I visited one of the largest, single-county metropolitan areas in this country. It also has the reputation of being one of the best governed, progressive urban centers. A state health official had recently pointed out, to quote a public agency investigating the matter, "that a serious problem of sanitary drainage exists in the southern third of ——— county . . . raw sewage and effluent from septic tanks often runs into roadside ditches, over lawns and fields, and into watercourses, and poses a threat to health. Attempts to control this sanitation problem through large lot zoning appear futile, since the clay soils in the area are often unable to absorb septic tank effluent. . . ."

Do-It-Yourself Building—A closely allied problem stems from the remarkably large proportion of houses put up by owner-builders, that is, persons building for their own ownership and, usually, occupancy. One post-War II study in several areas showed that about 27 per cent of the annual housing output was in this kind of building.[6] Quite surely a large proportion of these units are built in fringe areas and small suburbs where land prices are low and code regulations are few to nonexistent. Most of this building is the poor man's response to high construction costs. However much these efforts stir one's admiration, it must be admitted that they now add appreciably to the difficulties of assuring proper standards of design, location, and construction. They present a difficult and delicate problem that has been largely neglected.

Local Taxes and Debt—In a large proportion of suburban and fringe areas that are making some efforts, however inadequate, to establish or to maintain reasonable standards of public facilities and services, both property tax rates and local government debt are rising rapidly. It is fairly common now to find equalized tax rates in newer suburbs and even in fringe areas as high or even higher and rising more rapidly than in the central cities and larger suburbs with reasonably full complements of public facilities and services. And very few of these areas of recent growth have caught up with the public service needs of their growing and spreading populations. As to public investment in facilities, perhaps the most telling fact is that the outstanding local government debt in this country (most of which must be that of governments in metropolitan areas) increased by 107 per cent for 1950 to 1957.[7]

Variations in Tax Bases—A variation of this central financial problem is the marked disparity in tax base among suburban and fringe localities. An outlying locality lucky enough to get a new major shopping center(s) or industrial plant(s) often is, for the time being at least, in good shape financially. Often, however, in the same general area (sometimes, literally, just across a boundary street) are other local units in serious financial straits because their property tax bases consist almost en-

tirely of modest housing. Their residents, to be sure, trade at the shopping center, work in the factory and may even buy some of its products, but their governmental units benefit very little or not at all from the property values their citizens help to support in these ways. This result, of course, is a direct consequence of the balkanization of local governments in metropolitan areas. In 1957, the 174 standard metropolitan areas had 15,658 units of local government—an average of 90 per metropolitan area.[8]

Shortages of Recreation Space—Somewhat paradoxically, this loose, sprawling form of urban growth is producing enormous and ever-increasing areas of suburban and semiurban development that are sadly deficient in nearly all kinds of public open and recreational space. Yet, if any thing is certain about the forces contributing to urban dispersal, it is that one of the principal factors is the recent increase in and wider distribution of leisure time. Moreover, unless all the signs are false, this factor will continue strong in the urban pattern of the future. Who is agitating in behalf of, planning for, and acquiring in advance land adequate in amount and well located for parks, playgrounds, forest or wildlife preserves, public beaches or even, in many localities, for schools, libraries, or parkways? Of course, some people are doing their best, but it is clearly not enough.

The Butchered Landscape—Anyone in the least sensitive to amenity in his physical surroundings must be both appalled and enraged by much that shortsightedness, inexperience, public apathy, and commercial cupidity are doing with bulldozer and chain saw to the outlying parts of metropolitan areas. Perhaps this stupid butchery of often beautiful or at least pleasant landscape in the name of "city building" is no worse than what was done by earlier generations in other times of rapid urban growth. It is, however, on a vastly larger scale, and surely we ought to have learned something from the obvious mistakes of the past.

Three Warnings

Such a rapid treatment of so large and complex a subject can easily lead to inaccuracies and to inferences that will not stand careful examination. Let me, therefore, add three warnings to help guide further consideration of these matters.

Dispersal Not the Cause—Although the connections between urban dispersal or sprawl and the serious problems I have just cataloged (as well as others that may be added) seem quite evident, it would be a mistake to jump to the conclusion that dispersal is their cause. Dispersal is an active and significant factor in all of them, but other factors, some of them by no means minor, are also at work in various combinations: that is, our antiquated systems of local government finance, the irrational, hit-or-miss character of governmental structures in metropolitan areas, high construction costs, neglect of ways and means to facilitate the education of in-migrants in the difficult processes and manners of urban living, and the common neglect and downgrading of local public issues.

Not Only Problems—It seems clear to me that many, probably a large majority, of the newer residents of suburban and fringe areas have improved their lot by moving to these areas. At least they have escaped most of the congestion, herding, tensions, clamor, and ugliness that characterize most of the other residential districts open to them. Few of the faults of current urban dispersal are inherent in the process itself; most of them arise from the planless, shortsighted, stupid ways in which much of it is being carried on. The tragedy is not that

most urban migrants are worse off after they move; it is that so many of them are realizing only a part of the gains they might make and at costs which are either not necessary or are unnecessarily high.

The Choices Open—In current writing and discussion of urban growth and its problems, one often comes upon the view, express or implied, that as a matter of public policy a choice must be made between the prevalent brand of sprawl and relatively high density, largely apartment-type development, to which some of its advocates arrogate the adjective "urban." This, in my opinion, is nonsense and dangerous nonsense at that. Many more choices are open. The nineteenth century city, which still determines so many conceptions of urban, was a product of its time, technology, and culture. Its shortcomings, even for its time, were many and grave. For today and tomorrow they would be enormously greater. Nothing could be more illogical and more disastrous for our increasingly metropolitan civilization than to let the problems of urban sprawl drive us back to a pattern of city building that, on balance, is definitely worse, even if the new version of that pattern would be largely in metal and glass in place of brick, stone, and wood. Again, many more possibilities are open to us.

Looking Ahead

Above I hazarded the opinion that the strong urbanization movement, particularly in metropolitan areas, seems likely to continue. To this I wish to add that in all probability it will continue to be in some kinds of dispersed patterns, although it does not have to be a sprawl. I shall close by giving some indication of the probable order of magnitude of this future urban growth.

Recent projections of the population of the United States, made by the Bureau of the Census, indicate that in 1975 the population of this country may be between 207 and 228 million people.[9] We may take 220 million as a not unlikely figure. The 1950 to 1975 increase, then, would be approximately 70 million.

If metropolitan areas should continue to get 85 per cent of the national increase, their 25-year growth would be 59.5 million. This is about 71 per cent of the total population of the 168 standard metropolitan areas in 1950.

Let us look, too, at the possible future increase in the suburbs and rural-urban fringes, which with minor qualifications may be taken as the potential of dispersal—either as sprawl or in some other form. We may assume that over this period, 1950-1975, suburban and fringe areas will get 70 per cent of the national population increase. This would be only a shade more than these areas are thought to have received (68.7 per cent) during the first quarter of the period. Seventy per cent of 70 million is 49 million people. A comparison may be in order. In 1950, 14 metropolitan areas in this country had populations of more than one million. Their aggregate population was 44.4 million. Our estimate of the likely suburban and fringe population increase from 1950 to 1975 is equal, then, to the combined 1950 population of the metropolitan areas—not of the central cities alone—of New York-Northeastern New Jersey, Chicago, Los Angeles, Philadelphia, Detroit, Boston, San Francisco-Oakland, Pittsburgh, St. Louis, Cleveland, Washington, Baltimore, Minneapolis-St. Paul and Buffalo, plus almost five million persons more.

Where and in what manner is this flood of additional urbanites to be housed? What will they have in man-made physical facilities other than those for shelter? What additional, new, or revised forms of government, of other

institutional and informal ways of association will they need if future growth in population and buildings is also to deserve the designation of community development? How many questions can be asked today that raise more crucial issues for the future of public health in this country?

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Social Hygiene now Social Health

The American Social Hygiene Association is now to be known as the American Social Health Association. Frank H. Heller, of Dallas (Tex.), ASHA president, gives as reason: "Hygiene is an outmoded word which no longer is broad enough to describe the agency's family-centered program." ASHA works "to promote those conditions of living, environment and personal conduct which best protect the family as a social institution."

Now in its 50th year the ASHA was first called the American Federation for Sex Hygiene. One of ASHA's annual projects is the collection and publication of national statistics and trends in venereal disease infection, jointly with the ASTHO and the American Venereal Disease Association.

ASHA is at 1790 Broadway, New York 19. Conrad Van Hyning is executive director.

Two interesting aspects of modern technology, microwave exposure due to radar, and missile propellants, are discussed in this paper. Attention is centered by the author on the occupational health problems.

MICROWAVE EXPOSURE AND MISSILE PROPELLANTS AS OCCUPATIONAL HEALTH PROBLEMS

Colonel George M. Knauf, USAF (MC)

I PROPOSE TO DISCUSS very generally two representative areas in the spectrum of industrial medical practice in the Air Force in order for you to understand our approach to these problems. I have selected problem areas which I believe are the object of considerable interest and the source of some concern in the civilian community.

First, there are the problems involving the biological effects of microwave energy, more commonly termed radar hazards. Note that I use the word "effects." Our work has progressed sufficiently for us to be fairly certain that the beneficial uses to which this energy may be put will greatly outweigh any harmful results it may produce in man. Horrible things have been described as a result of a few seconds of exposure to the beam of commonly used radar equipment.[1] Unfortunately, the use of the word "radiation" in connection with this energy has served to further the concern of an uninformed public on the subject of exposure to this energy. The average citizen as well as a disturbing proportion of industrial medical workers, confuse this form of energy with ionizing radiation. It is important to this discussion to understand that there are no significant points of similarity of biological importance between these two forms of energy. At the moment, there is no concrete evidence of any effect other than tissue heating as a result of exposure to this form of energy.[2] It is true that there appears to be a cumulative effect produced by this energy, but even this effect seems to depend upon the production of a basic thermal reaction.[3] It is equally important to understand that present-day equipment poses no great threat to personnel other than those engaged in operating or maintaining the equipment. It is certain that radar today offers no hazard to residents of communities adjacent to radar sites. There is some reason to feel concerned about equipment to come, and we are proceeding with all haste to procure data essential for a competent evaluation of the risk potential of this new and higher power equipment. I know of no serious injury or death which can be properly attributed to exposure to the beam of any radar set.

Now, what have we discovered about this energy? We established an arbitrary maximum safe exposure level of 0.01 w/cm^2 for all frequencies of this energy and without any attempt to equate power levels in terms of the duration of the exposure.[4] Research results obtained so far indicate that our position is sound. We elected to inves-

tigate the effects of whole-body exposure to selected frequencies of this energy, since there is some reason to believe that biological effects will be dependent on frequency.[5] The frequencies selected bracket the portion of the electromagnetic spectrum in which are found all of the frequencies used in our present-day radar equipment as well as the frequencies now contemplated for equipment of the immediate future. We have also organized accelerated programs to explore the effects of this energy on the eye, the hollow viscera, and the nervous system. Briefly, we have learned this. There appears to be little biological injury as a result of exposure to energy above 3,000 megacycles.[6] In the case of the eye, we have established beyond any reasonable doubt that exposure to this energy can result in the production of opacities in the crystalline lens. In no instance, however, have we been able to produce such opacities by exposure to power levels below 0.12 w/cm^2 no matter how extended the duration of the exposure.[7] However, some tendency has been noted for the biological effects of repeated exposures to accumulate. It should be borne in mind here, that for this cumulative effect to manifest itself, it is essential that each exposure in the series be conducted at power levels above 0.1 w/cm^2 even though the duration of the exposure might be prolonged. Here one should remember that present-day gear will not produce this power density except in the center of the main beam in close proximity to the radiating antenna.[8] This information, acquired by competent research, should do much to allay the fears of people who reside in the immediate vicinity of radar sites. Even in the case of our operating and maintenance personnel, there need be little fear of injurious exposures from existing gear as long as certain common sense precautions are enforced. These precautions have been outlined in detail in pertinent publications,[9] and to date there has been no indication that these precautions have had any adverse impact on operating efficiency. With the introduction of equipment now on the drawing board one can anticipate that these precautions will have to be extended and augmented. We can foresee a need for protective clothing for use in high intensity R/F fields, as well as a need for shielded passageways to protect personnel as they move around an operational site in the discharge of their duties. All of this is now within the realm of possibility. We need only acquire the data which will outline the physiological parameters of safe exposure limits. This information is rapidly being developed as a product of our bioeffects research. Indeed we are optimistic today concerning our ability to provide a safe working environment, even in the face of the enormously increased power output which seems to be a certain requirement as we move into the era of the ICBM and space travel. In summary, our research has provided the following pertinent information:

1. The area of greatest biological concern seems to be about 3,000 megacycles.

2. The crystalline lens of the eye appears to be the most susceptible tissue element.

3. Some evidence of an accumulative effect has been developed.

4. Power levels below 0.12 w/cm^2 have not been demonstrated to be harmful.

5. Standing waves of biologically significant intensity have not been demonstrated at any frequency other than approximately 3,000 megacycles.

6. Some evidence exists of an electrical effect on nerve impulse propagation by exposure to extremely high frequency energy.[10] There is no plan at present to use these frequencies at high power levels because of propagation limitations. At present this property appears to warrant further study because of its possible value in connection with the diagnosis and treatment of selected neuromuscular diseases.

7. There is evidence of selective heating of certain tissues such as red bone marrow.[11] This may prove to be of some therapeutic interest.

These data have made it possible to provide operational guidance:

1. Existing equipment will not produce power levels that attain our maximum safe exposure level of 0.01 w/cm^2 at a distance of 500 feet even in the axis of the main beam.
2. Tower elevations, coupled with an upward tilt of the beam necessary to meet operational requirements, provide further protection for personnel.
3. Measurement technics and equipment have been developed to make possible accurate "on the spot" surveys to detect "hot spots" resulting from reflection of this energy by structures in close proximity to the radiating device.
4. A need to provide personnel protection is now recognized and is included in siting criteria for new equipment.
5. Unduly hazardous test and development practices have been identified and eliminated from laboratory operations.
6. The need for a rigid area monitoring program has been recognized and is being enforced.

The outlook is bright. No doubt there will be further scare stories in the future. There is an urgent need to inform the public as to the true nature of this problem and to explain the wide gap between biological effects resulting from exposure to this energy and exposure to ionizing radiation. Evaluate carefully any report of injury or death as a result of exposure to radar energy in the light of the foregoing information. As the spokesmen for an intelligent approach to industrial medical problems, we should not pass along reports of this nature until we have assured ourselves that the data on which they are based are factual and that the conclusions drawn are supported by competent research.

The second area of general interest to practitioners of industrial medicine is in the field of rocket and missile propellants. Here an entirely new field is rapidly opening. For the most part the problem revolves more about the required industrial medical guidance in operational terms than about the toxicology of the chemicals involved.[12] Chemicals seldom encountered previously in quantities greater than that which might be contained in a laboratory reagent bottle are now dealt with in tank car quantities. Enormous quantities of these extremely potent chemicals are now transported and handled by ordinary drivers of refueling trucks instead of by trained and hazard-oriented laboratory personnel. The decontamination and disposal problems which have arisen as a result have made many traditional practices obsolete. Our purpose is not to discuss the details of the chemistry involved, but to outline the broader industrial medical areas of interest. For this reason it is desirable to divide these chemicals into operational categories. First, let us begin with the well known and well understood chemicals of which fuming nitric acid is an excellent example. Here toxicological characteristics have been the subject of much study by competent observers over a period of many years. The potentials for physiological injury are quite well understood. It remains only to apply proven industrial medical practices to the use of these substances in the new missile environment. Second, are the group of chemicals which, while not strangers to the toxicologist, have not previously been used in quantities or under circumstances which warranted any comprehensive study of their toxicology. Unsymmetrical dimethylhydrazine is a good example of the chemicals in this group. Here there is a great deal of controversy concerning the hazard potential of these substances. In certain instances, investigators have reported an extremely high incidence of physiological damage as a result of exposure to such vapors, while in other cases equally knowledgeable investigators have reported few or no effects from exposure to significant concentrations of the same vapors. It is anticipated that research now in progress will indicate that the circumstances

of exposure, probably due to the magnitude of the handling problem, have produced any problem which is found to exist, as contrasted with any unusual intrinsic toxic properties of the chemical itself. It would appear that in general the solution to these problems might well be found in a sound program of industrial medical supervision.

Third, this is the group of chemicals just entering into test operations or programed for test in the foreseeable future. This group is typified by the fluorines and boranes. Considerable toxicological data are available concerning these chemicals; however, these data have for the most part been developed under laboratory conditions.[13] Many of the little problems incident to the use of these chemicals in missile operations have not yet been encountered. Past experience has shown that we can cope with new agents successfully by means of a rigid program of control and guidance. In the case of these particular agents however, largely because of their known extreme toxicological hazard, we are forced to look upon their use with no little concern. Our concern, to be sure, is directed more specifically to a program of safe handling than to the toxicology of the agents themselves.

In the area of missile propellants as in that of microwave exposure, our outlook is optimistic. We are certain that safe handling technics can be developed. The real and pressing need is to educate personnel so that they may know where the dangers lie, what are safe handling practices, what steps should be taken to offset the results of an accidental exposure and to recognize the signs of chronic exposure.

To accomplish this end we have established at the Missile Test Center a training program which will, within the limits of the state of the art, provide this guidance to all medical service personnel concerned with missile operations.

In closing, I wish to point out that at Cape Canaveral the greatest cause of injury is still the tool dropped from the top of a gantry, and the greatest cause of death remains the highway accident, so much a part of our modern way of life. I say with justifiable pride that after five years of operation of our missile test program at Cape Canaveral we have not experienced a single fatality which could be attributed to a cause peculiar to missile operations.

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Administration of tuberculin and histoplasmin skin tests revealed the existence of an area in southeastern Michigan with an unusually large number of individuals with past experience with histoplasmosis. This project was conducted jointly by public and voluntary health agencies.

A SURVEY OF TUBERCULIN AND HISTOPLASMIN REACTORS AMONG SCHOOL CHILDREN OF WASHTENAW COUNTY, MICH.

Otto K. Engelke, M.D., M.P.H.; Fay M. Hemphill, Ph.D., F.A.P.H.A.; Elizabeth Bushell, M.P.H.; and E. Belle McKinney, R.N., B.S.P.H.N.

History of the Studies

A STUDY OF school children's sensitivity to simultaneous tuberculin and histoplasmin tests was made in selected schools in Washtenaw County within a seven-week period during April and May of 1958. The testing program was part of an intensive County Health Department tuberculin case-finding project. Cooperating agencies were the six county Southeastern Michigan Tuberculosis Detection Project, the Washtenaw County Tuberculosis Association, the County Medical Society, the School of Public Health of the University of Michigan, the University of Michigan Medical Center X-ray Department, and the Michigan Department of Health. Policies and procedures were established by an advisory committee of representatives of most of the groups named.

Coupled with the desire to continue intensive efforts to locate cases of tuberculosis was the belief among some Washtenaw County practicing physicians that an unusually high incidence of pulmonary histoplasmosis would be found in the southeastern portions of the county, drained by the Raisin River and its tributaries.

Evidence introduced to the planning committee indicated that little extra effort and time would be required in administering and reading the histoplasmin tests, hence the decision was made to do both tests simultaneously.

The committee's decision to do histoplasmin testing on the skin of one forearm at the same time that tuberculin testing was done on the other, presented the problems of securing testing materials and of preparing educational items dealing with histoplasmosis as well as tuberculosis. The laboratories of the Michigan Department of Health supplied histoplasmin by making 15,000 doses of one lot available for this program.

As the testing proceeded, the press, the radio, and the public showed increasing interest in the histoplasmin testing. The unusually frequent positive reaction to histoplasmin of children in the Milan schools moved the County Medical Society to send a special request to the Michigan Department of Health for a large film study of histo-

plasmin-positive children in that area. The department responded with equipment and films. The Department of Roentgenology at the Medical Center of the University of Michigan provided its resources for developing and interpreting these x-ray pictures. In all geographical areas the original plan of x-raying all children with positive tuberculin skin reactions and their familial contacts was carried out.

When it became apparent that findings from the combined tuberculin-histoplasmin study were of extraordinary interest, the Washtenaw County Tuberculosis Association voted additional funds for the pursuit of the study. Arrangements for analytical assistance were made through the Department of Public Health Statistics of the School of Public Health at the University of Michigan.

Such a plan of cooperative effort within a community afforded an opportunity for health department personnel to work closely with research oriented local medical personnel to the benefit of all the participants. Such undertakings may pave the way toward further cooperative exploratory and research efforts. Simultaneous skin testing offered an excellent opportunity for participation in an applied research program on the part of a local voluntary agency (Washtenaw County Tuberculosis Association). Funds from the Association made possible the early compilation and evaluation of the data from which plans were made for continued testing and extensive epidemiologic studies.

Scope and Purposes of the Study

The purposes of the tuberculin skin reaction studies were to make estimates of the rates of positive tuberculin skin reactions by race, sex, and age among the children who voluntarily participated in the studies, and to determine whether there was evidence of differences between geographical areas as represented by the participants of the schools selected and/or by age, sex, and race groupings. As in all such surveys, one of the prime purposes was to find cases of tuberculosis among the participating children and their familial contacts.

The purposes of the histoplasmin testing were: (1) to study the distribution of positive reactors by age, race, and sex between geographical areas represented by participants of the schools selected; (2) to study the rate of reaction to both tuberculin and histoplasmin; and (3) to explore bases for the conviction on the part of physicians that pathology due to histoplasmosis was disproportionately distributed between areas within the county. Information on these subjects was to be made available to the physicians immediately in order to assist in their diagnostic procedures.

Several alternate methods of sample selection were considered, including the selection of specified grades within each of the schools in Washtenaw County; the random selection of schools within the county; and a combination of the method of random selection of schools with the method of predetermined grades. Another proposal was that of systematic sampling of children from school rosters for selected grades and/or selected schools of the county.

Facilities and personnel available for the study were judged by the advisory committee to require limiting the study to schools in areas where tuberculosis, hitherto undiscovered, might most readily be found. Areas selected in the eastern half of the county included the cities of Ann Arbor and Ypsilanti, Willow Run and some suburban and rural sections. These localities were chosen in part because the bulk of the county's Negro population resides in them. Moreover, as mentioned above, interest in histoplasmosis led to the decision to select the village of Milan because it is in the eastern portion of

the county and is located on a tributary of the Raisin River. Thus, the study group was not selected by use of probability sampling methods.

Nineteen schools were selected for the study, in which there were 13,037 children on the school rosters, and from which 9,098 school children finally participated. There exists neither a designed probability basis for evaluation of differences between the rates of reactors in the segments of the participating group nor for drawing inferences with regard to the child population of Washtenaw County. There is no way of ascertaining what biases may have been introduced in the selection of the participating children by the procedure of parental consent and actual participation.

The fact that the same procedures by which pupils become participants were used in all the schools is the basis for the assumption that the findings from the participants of the various schools are comparable for descriptive purposes.

Methods of the Studies

The scheduling of the schools for the skin tests and x-rays was done by the Health Department Tuberculosis Coordinator, who routed all literature, testing materials, and information to the nurses in each school, and generally supervised the project. Cooperation of school officials had previously been assured at a meeting attended by the County Health Department director.

The health educator of the Health Department and the executive secretary of the Tuberculosis Association collaborated in providing literature and information on both tuberculosis and histoplasmosis for health department staff and school personnel; the public health nurses in each school made this information available to and worked with school teachers in discussing the importance of the tests to the children. A mimeographed letter of explanation to the parents, written by the County Health Department director, was distributed through the schools, together with a card* for the parents to sign if they wished the child to have the tests. This card was then used for recording the date of testing and the results of the test.

Two teams, each consisting of a nurse, a technician, and a clerk, directed by a coordinating nurse, all employed by the Southeastern Michigan Detection Project, were scheduled to do the testing.

The tuberculin test was given intracutaneously in the left forearm and consisted of a five-tuberculin units dose of PPD-S contained in 0.1 ml of diluted Old Tuberculin. The histoplasmin test was given in the right forearm by intracutaneous injection of 0.1 ml of a 0.001 ml of United States reference standard antigen.

Syringes for the two tests were marked and kept separate, with one team doing all the tuberculin testing, the other doing all the histoplasmin testing. Two or three days following inoculation, reactions were read by measuring the transverse diameter of the palpable induration and recording the measurements on the field record mentioned above. The base line used in reading was six mm. Reading and recording of the skin reactions were done by the same teams. Tests of those children absent from the scheduled reading were read and recorded by the public health or school nurse.

Large x-rays were made of all positive tuberculin reactors by portable units furnished by the Michigan Department of Health. Similarly, histoplasmin reactors from the Milan schools only were x-rayed.

After the skin tests were read each record was edited for completeness of information, legibility, and appropriate-

* Copies of these cards are available upon request to the County Health Department, Washtenaw County, Mich.

ness of entries. Upon completion of the x-ray readings, the appropriate clinical findings were recorded on an x-ray reading report form and were transferred to the data card, which was returned to the Health Department, where it was edited for completeness. Subsequent to the rectifying of errors found in the editing process, the data dealing with the population totals were tabulated by hand in the Health Department, with assistance and advice from representatives of the Department of Public Health Statistics of the School of Public Health, University of Michigan. All pertinent data on the cards showing positive skin reactions were appropriately coded for IBM processing, including skin reaction and x-ray results. Data from the positive reactors were processed through many different phases of tabulation on IBM machines.

Data resulting from the histoplasmin tests were treated in the same way as those derived from the tuberculin tests, in so far as tabulation was concerned. The pursuance of these methods led to the summary tabulation of data according to various suggestions of the investigators, clinicians, and other interested persons.

Findings of the Studies

Table 1 shows the total number of the participating schools and the per cent of enrollment tested. Approximately 70 per cent of the total enrollment

Table 1—Number of Students Enrolled, Tested, and Per cent Tested by School—Southeastern Michigan Tuberculosis Detection Project, Spring, 1958

School	School District	Enrollment on Date of Test	Number Tested	Per cent Tested
Ann Arbor High	Ann Arbor	1,608	836	52.0
Chelsea North Elementary	Chelsea	292	220	75.3
Chelsea South Elementary	Chelsea	492	387	78.7
Dicken Elementary	Ann Arbor	445	326	73.3
Edmonson Elementary	Willow Run	348	245	70.4
Edmonson, Junior	Willow Run	582	366	62.9
Estabrook Elementary	Ypsilanti	431	357	82.8
Jones Elementary	Ann Arbor	248	202	81.5
Lincoln Elementary, Junior and Senior	Lincoln	1,460	1,100	75.3
Perry Elementary	Ypsilanti	691	582	84.2
Ross Elementary	Willow Run	729	550	75.4
Slauson Junior High	Ann Arbor	1,073	760	70.8
Tappan Junior High	Ann Arbor	950	631	66.4
Willow Run, Senior	Willow Run	315	117	37.1
Ypsilanti, Junior and Senior	Ypsilanti	1,698	1,095	64.5
Milan Elementary	Milan	731	610	83.4
Milan Junior	Milan	269	188	69.9
Milan Senior	Milan	476	344	72.3
Immaculate Conception, Elementary, Junior	Milan	199	182	91.5
Total		13,037	9,098	69.8

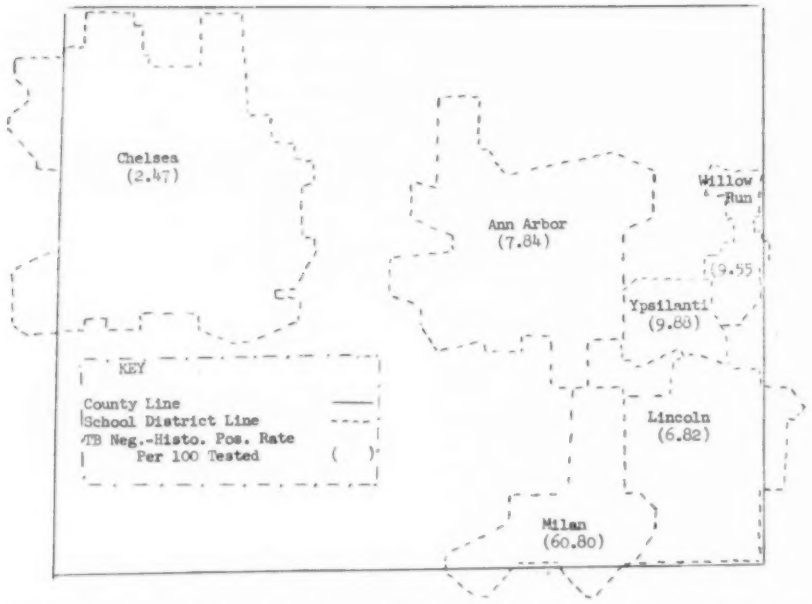

Figure 1—Washtenaw County, Michigan, Showing School Districts in which Skin Testing Was Done, Spring, 1958

participated in the studies. However, the range of participation by schools was from 37 per cent in Willow Run Senior High School to 92 per cent in Immaculate Conception Elementary School. The percentage of participation was greatest among elementary school children and least among senior high school children. By geographic grouping the schools of Ann Arbor participated at lower percentages than did schools from other areas.

A total of 9,098 children participated in this study, and these were divided equally, male and female. Of the total, 7,370 were whites, 1,650 Negro, and 78 of other racial background.

Figure 1 shows the results of reading the skin reactions to histoplasmin of the children by school districts. Over all schools tested, 15.8 per cent of the children were tuberculin-negative but histoplasmin-positive; 0.2 per cent of the children were both tuberculin- and histoplasmin-positive, but these are not included in Figure 1. No convincing observation of differences in the percentages of tuberculin-positive histoplasmin-negative reactions results between the several schools. However, the rate of histoplasmin positive reactors in the Milan schools was overwhelmingly greater than similar rates for schools of the non-Milan areas. Figure 1 shows that participants from Milan had a positive histoplasmin rate approximately nine times that of the bordering school district of Lincoln. Moreover, the percentage of positive skin reactors to histoplasmin but negative to tuberculin showed a well defined gradient by age. This finding of the preponderance of positive skin reactors to histoplasmin in the specific area of Milan is a subject

of great interest in the studies, and will constitute the basis of much of the following discussion. Only 20 of the 9,098 children tested were positive to both histoplasmin and tuberculin, indicating that there was no increased probability for a child who was positive to tuberculin also to be positive to histoplasmin. The hypothesis that a positive reaction to histoplasmin was independent, that is, not related to tuberculin, may be tested by multiplying the respective probabilities of (1) having a positive reaction to tuberculin, and (2) similarly, to histoplasmin among the total population and then multiplying this product by the total population. This results in 1.52 per cent times 15.98 per cent times 9,098, which approximates an expected number of double reactions of 22 children. In the study 20 children were observed to have double reactions. Therefore, the hypothesis of independence was accepted.

Table 2 shows the results of the skin testing for the Milan area and for the non-Milan area of the study by the age of the children who entered into

Table 2—Number of Students Tested, Per cent Positive Tuberculin Skin Reactions, Per cent Positive Histoplasmin Skin Reactions and Number Positive to Both Tuberculin and Histoplasmin Skin Tests, By Area of Residence and Age—Southeastern Michigan Tuberculosis Detection Project, Spring, 1958

	Milan				Non-Milan			
		Per cent		No. Pos.		Per cent		No. Pos.
Age	Number Tested	Pos. TB-Neg. Histo.	Pos. Histo-Neg. TB	to Histo. and TB	Number Tested	Pos. TB-Neg. Histo.	Pos. Histo.-Neg. TB	to Histo. and TB
5	47	0.0	23.4	–	288	0.3	2.5	–
6	71	0.0	21.1	–	490	0.6	2.5	–
7	101	0.0	36.6	1	483	0.6	3.9	–
8	78	0.0	46.2	–	497	1.0	5.6	–
9	83	0.0	62.7	–	489	0.4	5.1	–
10	131	0.0	58.8	1	503	0.4	7.0	–
11	159	1.8	49.1	–	488	1.2	7.0	–
12	112	0.9	49.1	1	708	0.7	7.6	2
13	114	0.0	67.5	–	901	2.0	8.3	3
14	106	1.9	86.8	–	869	1.5	10.9	–
15	104	0.0	85.6	2	827	1.7	11.2	3
16	97	0.0	83.5	2	585	2.2	11.3	3
17	72	2.8	84.7	–	417	4.1	12.7	–
18	36	0.0	91.7	–	175	2.9	13.7	2
19	7	0.0	100.0	–	32	9.4	12.5	–
20	3	0.0	66.7	–	5	0.0	20.0	–
21	1	0.0	100.0	–	1	0.0	100.0	–
22	–	–	–	–	–	–	–	–
23	–	–	–	–	–	0.0	0.0	–
Unk.	2	0.0	50.0	–	15	20.0	0.0	–
Total	1,324	0.6	60.8	7	7,774	1.4	8.1	13

Table 3—Number* and Rate of Students Tested by Type of Reaction, Age and Race—Southeastern Michigan Tuberculosis Detection Project, Spring, 1958

Reaction and Race	Number						Rate per 1,000					
	5-9	10-14	15-19	20-24	Unk.	Total	5-9	10-14	15-19	20-24	Unk.	Total
TB												
White	7	30	44	–	–	81	3.8	8.7	21.2	0.0	0.0	11.0
Negro	8	23	21	–	–	52	10.6	37.0	78.4	0.0	0.0	31.5
Other	–	4	1	–	–	5	0.0	142.9	83.3	0.0	–	64.1
Total	15	57	66	–	–	138	5.7	13.9	28.1	0.0	0.0	15.2
Histo.												
White	183	572	440	3	3	1,201	99.6	166.2	212.4	500.0	230.8	163.0
Negro	55	105	78	1	1	240	73.1	168.8	291.0	250.0	250.0	145.5
Other	5	2	5	1	–	13	135.1	71.4	416.7	1,000.0	–	166.7
Total	243	679	523	5	4	1,454	92.5	166.0	222.4	454.5	235.3	159.8

* The numbers grouped under TB include skin reactions—Pos. TB, Neg. Histo. and Pos. TB, Pos. Histo. The numbers grouped under Histo. include skin reactions—Neg. TB, Pos. Histo. and Pos. TB-Pos. Histo. Therefore 20 persons are counted in both groups.

Table 4—Students Skin Tested and X-Rayed by Type of Skin Reaction, X-Ray Reading and Area of Residence—Southeastern Michigan Tuberculosis Detection Project, Spring, 1958

Type of Skin Reaction and Area of Residence	Total X-Rayed and Read	X-Ray Reading							
		Negative		Tuberculosis		Histoplasmosis		Other	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Pos. TB-Neg. Histo.									
Total	112	77	68.8	33	29.4	1	0.9	1	0.9
Milan	8	5	62.5	3	37.5	–	0.0	–	0.0
Non-Milan	104	72	69.2	30	28.8	1	1.0	1	1.0
Neg. TB-Pos. Histo.									
Milan*	756	570	75.4	–	0.0	186	24.6	–	0.0
Pos. TB-Pos. Histo.									
Total	20	14	70.0	6	30.0	–	0.0	–	0.0
Milan	7	7	100.0	–	0.0	–	0.0	–	0.0
Non-Milan	13	7	53.8	6	46.2	–	0.0	–	0.0
Total									
Total	888	661	74.4	39	4.4	187	21.1	1	0.1
Milan	771	582	75.5	3	0.4	186	24.1	–	0.0
Non-Milan	117	79	67.5	36	30.7	1	0.9	1	0.9

* Reactors of this category were x-rayed only for the Milan area.

the study. Those positive to tuberculin but negative to histoplasmin were found more frequently in the non-Milan study population than in the Milan population. However, the percentages found were judged to be in reasonably close agreement with the expectation of positive tuberculin reactors, and the results are, therefore, not considered unusual. The unusually high rate of positive reactors to histoplasmin is again displayed for the Milan area. The gradient by age among the study population of non-Milan areas shows a relatively linear relationship between per cent positives and age, with the possible exception of a plateau effect in the ages 10 to 12. Participants in the Milan area showed a precipitous rise in percentage from year to year for ages six through nine years, then a decrease in percentage for two years, and again a precipitous rise to age 14. The children beyond 14 in the Milan group appeared to produce relatively the same rate of reaction.

The plateau effect in ages 10-12 of the non-Milan participants and the reduction in percentage of positives among the Milan participants during the same years raises a question about the onset of puberty and its association with this phenomenon. A special tabulation of the data by age and sex showed essentially the same pattern for each sex. Thus there was no clear support from the analysis for onset of puberty as a controlling factor.

Table 3 shows the number of reactors and the rate per 1,000 by type of reaction and race for both tuberculin and histoplasmin. Approximately three times the rate of positive tuberculin reactors was found among the Negro participants as compared with the rate of the white participants. The rate of positive reactors to histoplasmin was less, but only slightly less, among the Negro participants as compared with the white participants. A direct relationship is shown between rate of skin reaction and age for both histoplasmin and tuberculin.

Table 4 shows the results of x-ray readings of the participants. There was an insufficient number of positive x-ray readings to tuberculosis among the Milan participants to suggest that their rate was higher than that found among the non-Milan participants. The percentage of positive x-ray findings of tuberculosis for the total group of positive tuberculin reactors was 29.4. One x-ray reading of a positive tuberculin but negative histoplasmin reactor was recorded as having positive histoplasmosis findings, while six of the x-rays of children who were positive to tuberculin and positive to histoplasmin were found to have positive tuberculosis findings but all the double reactors had negative histoplasmosis findings. The percentage of positive x-rays for findings of histoplasmosis was 24.6 in the Milan group. Note that histoplasmin skin reactors for the non-Milan participants were not x-rayed unless they were also positive to tuberculin.

These findings indicate that changes of the lung had resulted in approximately one-fourth of the participants of Milan who were negative to tuberculin but positive to histoplasmin. The results of this study suggest that more intensive and continued study of the Milan population might prove profitable.

Milan is located on the Saline River, a tributary of the Raisin River, and at a point near the northeastern edge of the Raisin River drainage basin. The geographic and topographic location of the Milan school district suggests that the area of high infection may be more extensive than Milan and its immediate environs. Before tabulations for the study were completed, the Department of Dermatology of the Medical Center and the Department of Epidemiology of the University of Michigan School of Public Health expressed an

interest in continued cooperative studies of histoplasmin findings in the Milan area.

Suggestions for Continued Studies

1. Verify the reactions to histoplasmin of children in the Milan schools on small groups of those who were found positive at the time of the survey and from a similar group who were similarly found negative. An investigation into the methods and procedures used in Milan will be indicated unless the results of the survey are confirmed. If the results confirm the survey findings, the following plan of action or some similar program of study will be indicated.

2. Make histoplasmin tests on children from schools located in the drainage area of the Saline River, preferably using the same lot of vaccine as used in step (1) above, in an attempt to delimit the geographic boundaries of the concentration of positive histoplasmin reactors.

3. Continue exploration into other areas of the Raisin River's drainage basin, guided by the findings from step (2) above, to ascertain geographical boundaries of the area(s) of high rates of histoplasmin reactors. If only the Milan area produces high rates of histoplasmin reactors, epidemiologic studies of the sources of infection and probable modes of acquisition of infection with Milan as the center of interest may be indicated. The problems of investigation will be changed if the area of high prevalence is found to be extensive. The center of interest in this case may lie in the sharp difference in histoplasmin positive rates in Milan and in the adjacent school districts.

Summary of Findings

The procedure of administering tuberculin and histoplasmin skin tests demonstrated for the first time that there exists, in southeastern Michigan, an area of unusually high incidence of past experience with histoplasmosis.

The combined program increased the time required for tuberculin testing alone by 20 per cent but the need for additional health education was slight compared with the dividends reaped from this program. Simultaneous tuberculin and histoplasmin testing can be used to develop an area of interest in which public and private health agencies work well together. Cooperation achieved by such a project may be reflected in better understanding and improved working relationships in other health programs.

This relatively simple combined testing program enhanced the findings of disease processes and of pathology of the chest and has contributed information valuable to physicians in connection with differential diagnosis.

These studies provide additional evidence to show that careful examination of chest films might profitably be supplemented by other tests in any differential diagnosis between histoplasmosis and tuberculosis, especially for residents of areas known to have high rates of histoplasmin reactors.

Dr. Engelke, Miss Bushell, and Mrs. McKinney are all associated with the University of Michigan School of Public Health, Ann Arbor, Mich. Dr. Hemphill, formerly with the university, is now with the National Institutes of Health, Bethesda, Md.

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Journal of Public Health

EDITORIALS

Plus ça Change . . .

Is it a dream to hope that hygiene or preventive medicine may yet largely supersede the office of her elder-born and well-beloved sister [curative medicine], whose charitable mission is with the cure or alleviation of disease? Unquestionably, true science and true humanity have a more grateful employment in preventing than in curing sickness; and mental no less than bodily diseases present a large and inviting field for the cultivation of hygiene. But the [medical] psychologist requires aid from other branches of science as well as that of medicine, and an acquaintance with the principles of guiding or educating the human mind is a most valuable acquisition to the physician engaged in the treatment of insanity. The larger is the amount of those two branches of knowledge separately, and the more intimate is their combination in the same individual, the more complete is the educational capacity of the psychiatric physician for his vocation.

"The sciences of medicine and psychology are no less interwoven with one another, than they are connected with other branches of human knowledge, and more especially with those embraced under the general head of social science. . . .

"The connexion between social science and the science of medicine and psychology is broad and obvious. What branch of social science is there which does not throw light on some question or other coming within the range of the duties of the physician; and on the other hand, does not the science of medicine, and its specialty of psychology, throw light on the many branches of social science? Strange would it be, if the physician did not take his place side by side with the statesman, the jurist, the social economist—with those who concern themselves in matters affecting the public health, the punishment or the reformation of the criminal, with trade or international law. In all these departments, the opinion of the physician is required, sometimes more, sometimes less; and the value of that opinion, and the estimation in which the profession is held, and its usefulness, will plainly be not a little enhanced by the possession of sufficient knowledge of the general principles of those sciences, and their practical application, to enable the person giving an opinion to appreciate the connexion between medicine and that branch of social science on which his knowledge is brought to bear."

The reader may find the statement quoted above both familiar and strange. This should occasion no surprise for the

statement was made just about a hundred years ago by Dr. Lalor in his address as the incoming president of the Association of Medical Officers of Asylums and Hospitals for the Insane in Great Britain. And at the same time he does express ideas that are of our time, modern up-to-date ideas. Yet this is a very common phenomenon, and one easy enough to find if we but look for it. The state of the arts and sciences at any time is the product of development through centuries, and to understand it we must know what it has been, and what it is tending to become.

Nonetheless, the current reader tends to be surprised and remarks on the modernity of our predecessor. For there are few tricks of the professional intellect more curious than the tendency to ascribe current achievements and thoughts to contemporary efforts, in bland unconsciousness of the foundations upon which they rest and without which they might never have come to fruition. This situation has its causes and its dangers. It arises from the method of training professional workers, by which progressive additions to the sum of knowledge are made in increasingly limited subject areas. The consequence is a tendency to produce minds in a groove, minds characterized by a celibacy of the intellect and which hesitate to venture out upon the wilder shores of thought. As Montaigne said, "If I converse with a strong mind and a rude jouster, who presses me hard and digs me right and left, his ideas touch off my own." We are thus brought to the position that as professionals we have an obligation to press ahead, to advance knowledge, and to see that it is brought to bear on the problems of the community. At the same time, however, we must see ourselves in relation with the past and the present. Ideas and methods do not arise uncaused and unconditioned in empty space. They have origins and antecedents. Furthermore, we cannot remain limited to our specific area of special competence. We must know what is happening in other fields by casting our nets widely, and keeping alert to the unforeseen relations that may appear. Thought is one of the manifestations of human energy and can be brought to bear more effectively on the human enterprise if we will but create the conditions.

Some Facts About the Aged

AT A TIME when society has begun to take note of older people and their problems, it is important to have as much information as possible about them. Several recent research notes of the Social Security Administration offer interesting and useful information on such matters as the family status of the aged in 1959, their money income in 1958, and the numbers receiving payments from the Old Age, Survivors, and Disability Insurance Program, the Old Age Assistance Program, or from both.

As of March, 1959, there were 15,294,000 persons aged 65 and over in the continental United States. Half of these were married and living with a spouse. Almost one-quarter lived alone or with persons who were not relatives. A small number (2.5 per cent) were in institutions, and the remainder lived with relatives other than a spouse. Women predominate among the nonmarried aged who share a home with relatives and also among those living alone or with nonrelatives. On the other hand, the married men aged 65 and over outnumbered the married women in this group (4.7 million men and 2.9 million women, respectively). This arises from the circumstances that many of the married men have wives who are not yet 65.

According to a Census Bureau study of incomes for 1958, practically all men aged 65 and over had some money in-

come in that year. These were persons who were not in institutions. A little over one-third of the aged men (35 per cent) received $2,000 or more, while roughly another third (32 per cent) had less than $1,000. About 18 per cent of the men worked at full-time jobs, that is, 345 or more hours per week for 50 weeks in 1958. Half of this group had incomes of at least $3,560 amounting to more than twice the median income for all aged men. On the other hand, when all the aged men, including the small number with no money income, were taken together half the men had $1,440 or less.

The Census Bureau study involved about 2.2 million aged women. More than a quarter of these women reported no money income of their own. It is suggested that probably as many as half of the total group were mothers or other dependents of the family head or his wife. The rest were married women supported by their husbands. A small group (6 per cent) had full-time employment, and in terms of income were better off than most aged women. Half of them had a cash income of at least $2,300. On the other hand, for all the women, including those with no money income of their own half the group had less than $560, while barely one-fourth had more than $1,000. Of the women with some income of their own, half had less than $780 and one-tenth had $2,000 or more.

The over-all situation is equally interesting and revealing. It is reported that the information on combined money incomes for men and women in 1958 shows a very slight improvement over the 1956-1957 level. However, about three-fifths of the aged, who were not in institutions, still had cash incomes under $1,000, and the proportion with $3,000 or more remained at 12 per cent.

Many of these old people were receiving payments from the federal government. As of June 30, 1959, eleven and one-half million people aged 65 and over were receiving monthly payments under the Old Age, Survivors, and Disability program, the Old Age Assistance program, or both. There were 9.7 million who received payments from OASDI, 2.4 million who got payments from OAA, and 650,000 from both programs. The persons receiving these payments represented 741 per 1,000 aged persons in the United States.

These figures are well worth pondering. Although the proportion of persons 65 years of age and over will not increase substantially, if at all, over the next two decades their numbers will increase steadily from somewhat over 15,000,000 now to an anticipated 21 million in 1975. Despite any optimism concerning the future, one may anticipate problems of health and welfare among the aged. Who will deal with them, how can they be handled, and what is the role of the aged person in this situation?

1960 Is the Golden Anniversary Volume
of the American Journal of Public Health

LEGISLATIVE NEWS

President Eisenhower's public health budget for the fiscal year ending 1961 has been published. For the most part no great changes are indicated from the 1960 budget request. The following is a résumé of the budget request for agencies of the Department of Health, Education, and Welfare directly relating to health programs throughout the nation.

Federal Grants to States

For general health grants to the states $15 million has been requested, equaling the present fiscal year's appropriation; $2 million is requested for Title I training grants for public health workers. Because the authorization for aid to schools of public health expires June 30, 1960, there is no request for funds for this purpose. The request for grants to states for control of venereal disease is the same as last year, $1.7 million; this was later increased by Congress to $2.4 million. The request for tuberculosis grants to states is also identical with the amount requested last year, $3 million, despite the fact that Congress increased to $4 million the federal contributions for this purpose.

Grants to states for water pollution control programs total $3 million, identical with last year's appropriation. The request for grants to construct waste treatment works, however, is only $20 million, compared with the $45 million appropriated by the Congress for the current fiscal year. There is also a sharp decrease in the Administration's request for Hill-Burton funds as reflected in the $126,200,000 requested, as compared with the $186,200,000 appropriated for this purpose last year.

The request for grants to states for heart disease control programs is $3,125,000, for cancer control programs $2,250,000, and for mental health activities $5,000,000, each the same as last year.

A total increase of $2 million is being requested for the three grant programs under the Children's Bureau. Two-thirds of $1 million is to be added to each—Maternal and Child Health Services, Crippled Children Services, and Child Welfare Services.

Vocational rehabilitation grants to states are to be increased from the current $51,900,000 to $54,500,000 for 1961.

PHS Activities

One innovation to be noted in the budget request is a new grouping of PHS activities under the title of Environmental Health Activities. Included are the air pollution program; water supply and water pollution; radiological health activities; milk, food, and general sanitation; occupational health activities; and accident prevention. The Administration's request for air pollution control activities is to be increased from $4,312,100 to $4,900,600. For water supply and water pollution, PHS activities are to be increased from the 1960 level of $4,185,900 to $6,372,600. Radiological health activities has a proposed increase of two and a half times—from $2,437,700 to $6,103,200. Milk, food, and general sanitation, occupational health, and accident prevention programs are to remain at or near the current year's level of operation. The appropriations requested for general health activities, control of tuberculosis, communicable disease activities, and the PHS hospitals and medical care program are to be continued at comparatively the same level as for the current year. Foreign quarantine activities would receive a modest increase from $4,685,800 to $4,812,000. Indian health activities are

to receive an increase from the current year's $45,500,000 to a requested $47,526,000, and construction of Indian health facilities is to receive an appropriation of $6,964,000 in comparison with $4,787,000 appropriated for fiscal year 1960.

Research

The total appropriation requested for activities at the National Institutes of Health is $400 million, a repetition of the amount appropriated for the current fiscal year. Some of the appropriations requested for individual institutes differ from the amounts appropriated for last year, the objective being to provide additional funds for research activities. For general research and services the appropriation is to be increased from slightly less than $46 million to $47,260,000, with research projects to be increased by approximately $3 million, and grants for training to be reduced by $1.5 million.

The National Cancer Institute under the appropriations request would be cut from $91.3 million to $88.9 million. The department estimates that the Institute will expend but $87.5 million of the funds appropriated for fiscal year 1960 and consequently envisages a slight increase in activity for this Institute in 1961 despite requesting less funds than were appropriated for the current year. For mental health activities a decrease of approximately one-half million dollars from the $68 million appropriated for the present year is noted in the amount requested for 1961. Here again an appreciable increase is recommended for research projects with a comparable decrease in funds available for training grants.

An increase is requested for the National Heart Institute from the current $62.2 million for 1960 to $63.2 million for 1961. Both the intramural and extramural research activities are to be increased. For dental health activities an appropriation of $10 million for 1960 would be surpassed by the requested $11.2 million for 1961, with the increase to be reflected in greater expenditures for extramural research projects and research activities at the Institute.

The Arthritis and Metabolic Disease Institute is requesting $47.5 million in comparison with the 1960 appropriation of $46.9 million. The Institute of Allergy and Infectious Disease would receive an increase of approximately $700,000 over last year's appropriation of $34 million. Funds available for training grants in this Institute would also be lessened by approximately $1 million, which would be added to research projects.

Funds for the Institute on Neurology and Blindness would be decreased from $41.5 million appropriated for fiscal year 1960 to a requested $39.7 million for 1961. Research activities are to be increased by $1 million while training activities are to be reduced from $8.9 million to $7.3 million. Grants for construction of health research facilities would be only $25 million for 1961 compared to the $30 million appropriated last year.

A new activity is requested under the heading of Scientific Activities Overseas, for which $3.7 million is requested to be financed primarily by the use of counterpart funds made available abroad by the sale of surplus U. S. agricutural commodities.

Pending Health Legislation

Congressional interest, as evidenced by hearings on health matters, has thus far been understandably topical in nature. The House Interstate and Foreign Commerce Committee's initial foray into the health field concerns the problem of color additives with frequent reference to the recent cranberry episode and the problem of lipstick colorings. Secretary Flemming, on behalf of the depart-

ment, requested authority for discretion in setting tolerance levels of color additives.

The Health and Safety Subcommittee is considering the use of counterpart funds relative to the Health for Peace bill. There is no action to report at this time.

Due to the anticipated short congressional session the subcommittees of the House Appropriations Committee are acting with even more than the usual dispatch in the consideration of budget requests for fiscal 1961. The Appropriations Subcommittee on Labor-HEW began hearings on January 25, and even with a week's recess to allow the Republican members to attend to Lincoln Week speeches, was scheduled to report the bill to the full committee on March 25, with the House voting on the bill March 28. At the time of writing, it is anticipated that the Senate Appropriations Subcommittee handling this bill will begin its hearings before the House has acted on the bill. Also, as of the date of writing, there is no indication from the Health and Safety Subcommittee as to when it will study the extension of federal aid to schools of public health, the establishment of a National Accident Prevention Center, and the establishment of the grant-in-aid program to state and local health departments for training of health personnel. No action has been announced on bills previously reported that have passed one House but lack action in the other. This is traditionally a time for getting organized, a seemingly wasted interval, but there should be plenty of activity beginning about March 15.

Journals Wanted

The Association has received several requests for the January, 1958, and January and February 1959 Journals from persons who bind the magazines. These persons and the Association would be grateful if members having no use for these particular issues would make them available to others. Such generosity will be much appreciated. The magazines should be sent to the Association office at 1790 Broadway.

THE APHA STAFF REPORT FOR 1959

THIS REPORT of the Executive Director and APHA staff to the members and Fellows is not intended to and does not replace the more detailed reports for 1959 of the Executive Board, the Standing Committees, the Technical Development Board, and the Association Committees; these will be published in full in the Journal. It is rather a general review of APHA activities with some highlights of how the Association staff in 1959 worked with the membership in its program to shape services to the needs of the people.

APHA leadership enables the Association to fulfill the obligations it has assumed to serve its members and the public. Because APHA fulfills them, public health workers can claim the right to professional self-determination in the public domain.

The right to establish the variety of standards required for the highest quality professional practice; the right to pursue scientific action along lines the profession deems best; the right to free assembly and organization in a professional setting—these have not come to public health as birthrights. The members and Fellows of APHA have earned them, as they continued to do throughout 1959.

APHA leadership action takes place within two organizational frameworks. First, APHA governs itself, sets policy, and speaks for the public health worker through the Section Councils, the six Association Committees, the Executive Board, and the Governing Council, which consists of Section officers, elective members and delegates of Affiliated Societies and Regional Branches. Second, APHA sets the pattern for the modern professional practice of public health and explores the frontiers of public health problems through the work of Section committees, the Standing Committees, the Technical Development Board, and the Program Area Committees.

To assist the membership in their activities in these two APHA frameworks, the Association employs an Executive Director and staff. In 1959, 80 persons were on the Association payroll—72 full-time and 8 part-time.*

A plan to study the staffing requirements of APHA offices was implemented during the year when a staff specialist began an analysis and classification of all 80 positions. The results will be presented to the Executive Board early in 1960. In another phase of personnel administration the board instituted an improved retirement program for Association employees.

Geographically, staff operated in five areas—1790 Broadway, New York City, where headquarters are located, the Western Regional Office in San Francisco, the Washington Office, the University of North Carolina, and the Philadelphia Health Department.

A sampling of communications items leaving the central office will give some idea of the productivity of the administrative-clerical staff in 1959. A partial listing amounts to an imposing 188,000 pieces. This included four issues of "This Is the News," the Association newsletter (52,000); Section newsletters (25,000); membership bills, pocket cards, and ballots (44,000); and general correspondence (24,000). A similar record of accounting department activities would also tell much about the variety and volume of staff output required for the conduct of Association business. The work of administrative and professional staff members will be illustrated in the balance of this report.

* A chart showing the activities of the APHA administrative staff is found at the end of this report.

Association Activities Classified

APHA's major activities in 1959 may be categorized in terms of the roles the Association played in public health. These roles reflect the major areas of interest of the individual member during the course of his professional life. APHA activity—both of members and staff—has continuity and direction because of these interests.

A public health worker is schooled, measures up to standards of practice, keeps up to date with the new knowledge of his discipline, takes public stands and constantly engages in a search for new dimensions of action to serve the public better. It is APHA's function to assist him in each of these areas. Staff activity for the year may thus be accounted for in the fields of:

Professional Preparation
Professional Qualification
Continuing Education
Public Policy
Professional Program

As introduction, a description of membership, and staff activities relating to it, points up the importance of organized association to a profession, its special "plus."

Membership

The most important assets of the Association are its members, who by their stature and representativeness determine the character of the APHA.

Section membership committees conceived and carried out campaigns during 1959 to bring the values of joining their professional society to the attention of many hundreds of public health workers. The membership secretary and her staff provided counsel, administrative support, and new membership promotion materials.

In the final weeks of the year, the 1960 President, Malcolm H. Merrill, M.D., initiated an intensive person-to-person movement, through the Section officers, to substantially increase the present membership.

More than 1,000 new members were elected in 1959; 221 members were elected to Fellowship. Membership as of December 1, 1959, distributed by Section affiliation, is shown in the following tabulation:

Section	Fellows	Members	Total
Dental Health	119	247	366
Engineering and Sanitation	337	1,025	1,362
Epidemiology	269	549	818
Food and Nutrition	201	428	629
Health Officers	557	1,135	1,692
Laboratory	317	998	1,315
Maternal and Child Health	160	378	538
Medical Care	294	816	1,110
Mental Health	78	339	417
Occupational Health	139	313	452
Public Health Education	354	933	1,287
Public Health Nursing	311	1,238	1,549
School Health	105	308	413
Statistics	135	346	481
Unaffiliated	192	507	699
Grand Total	3,568	9,560	13,128

Sustaining Members, to whom the Association is indebted for moral and financial support, number 52. Honorary Members 57, and Affiliated Societies and Branches 49, making a grand total of 13,286.*

At the Atlantic City Annual Meeting in October, the Association honored 51 forty-year members. There are on the rolls at the end of 1959, 25 persons who have been members for 50 years.

Attitudes toward the APHA, both of members and of persons belonging to state affiliated societies but not to APHA, were explored during the year by the Committee on Affiliated Societies and Regional Branches with staff assistance. The results, soon to be released, will be useful to the Section membership committees and to the administrative staff as they seek to add to the professional resources of the Association and to its influence by widening its membership circle.

Affiliated Societies and Regional Branches

APHA's ability to plan and act productively is in direct proportion to the strength of the bonds of interest that link its multidisciplined members together in the pursuit of common objectives. Thus, on the national scene, APHA gives high priority to its policy of strengthening ties with the Affiliated Societies and Regional Branches.

This priority continued to be met in 1959. Staff members or current officers of the APHA attended 32 of the annual meetings of the 49 Affiliates and Branches during the year. Such APHA contacts were approximately double the number of those made in recent years.

The Western Regional Office in San Francisco completed its first full year of operation in 1959. During that period it has provided an excellent field demonstration of how a full-time staff can assist state and regional affiliates. The director is executive secretary for the Western Branch of APHA. He and his staff have experimented with multiple billing for affiliate members, conducted management institutes, participated in affiliate meetings, and shared in the planning of such special projects as the Regional Migratory Labor Conference.

The Western Regional Office initiated a most significant program of continuing education for Western Branch members in 1959 in cooperation with the University of California School of Public Health. Financial support includes a grant from the National Heart Institute. The workshops, seminars, and lectures, to begin in early 1960, are planned as refresher courses for qualified public health workers.

* Membership records have been maintained manually over the years. In 1959 the Membership Department and Professional Examination Service investigated and approved IBM processing for their needs. Conversion to IBM is under way.

Professional Preparation

The APHA has a firm and abiding tradition which holds that those who are attracted to the public health profession should receive the best training possible in the discipline of their choice. To give substance to its plans for fostering improved formal education in public health the APHA now has the services of a full-time director of professional education. With his help the Committee on Professional Education increased and expanded its activities during 1959.

The system for accreditation of schools of public health was revised and improved. The Executive Board approved CPE's recommendation that accreditation be continuing rather than annual. Yearly reports to the APHA on curricu-

lum and faculty were initiated which will indicate when the visits are needed by a team of three: a consultant familiar with professional education in many settings, a public health administrator, and APHA's director of professional education. Thus, it is now possible for APHA to more effectively help to develop and support improvements and extensions in intramural teaching programs.

Through CPE's new clearing-house of information on students in accredited schools, the staff has collected and interpreted data which makes available for the first time a profile, drawn in considerable detail, of the nation's public health students (1,568 in 1958-1959). Collected data will also be helpful, for example, in supporting statements of the need for more governmental training activities.

The evaluation of professional education in an always evolving public health must be continuous. The director of professional education, following an initial study by a CPE subcommittee, has helped set up a joint committee for that purpose with the Association of Graduate Schools of Public Health and the Association of State and Territorial Health Officers.

1959 saw an increase of CPE staff relations with other educational groups in the many fields of health, and an upsurge in requests for its consultation services. Traditional CPE activities continue, such as the formulation and revision of qualification statements.

Professional Qualification

Approximately 17,000 people on the job, beginning work or qualifying for licensure in public health and related fields in 1959, took examinations prepared and given by APHA's Professional Examination Service. From this it is obvious that, day in and day out, this service of, by, and for public health workers has widespread influence on the standards of American public health practice. The influence is salutary in that these objective examinations not only assess the relative degrees of competency of professional workers but also provide a basis for the uniformity of high-quality practice across the land.

Of the total examinees approximately 13,500 were seeking either appointment or promotion to some 900 public health positions, as follows: 2,500 at an administrative level; 3,500 at a supervisory level; 3,500 at the staff level; 4,000 at the nonprofessional level. Applicants were in 19 professional health disciplines. Approximately 3,700 took PES examinations to qualify through state licensing boards for admission to professional practice, including 2,000 physicians, 1,000 veterinarians, 300 physical therapists, and 400 pharmacists.

In 1959, as in the recent past, PES added about one professional examination a week to its library, which now totals some 800 examinations. These are kept current by the addition of about 150 questions a month to PES's file of 75,000. Questions for this file have been written by 2,300 specialists willing to engage in the taxing creative effort demand; 2,500 persons of outstanding achievement in health fields have each reviewed 50 or more of the questions within their competency judging them on validity, importance and difficulty. In 1959, PES had 21 part-time consultants on its staff, their contributions also constituted a most significant addition to improved public health personnel standards. By such methods for keeping up to date PES continues to meet the many and varied needs of the organizations it serves.

During 1959, 26 states, three counties and seven cities used PES examinations for employment and merit system purposes, on a contract basis. Forty-eight

state licensing boards, 10 national professional and certifying agencies, 30 schools offering professional training in health fields, and the Public Health Service all require PES tests of applicants.

As PES approaches its 20th year of operation it is worth noting that until 1950 it received almost all its income in the form of grants from the Public Health Service, the Children's Bureau, and the National Foundation for Infantile Paralysis. 1959 was the sixth year during which PES expenses were met by fees for service. The gradual shift to financial self-support is one evidence of the confidence which the various disciplines in the profession have in PES. Another evidence is the frequency with which the director of PES is called upon to address groups interested in the upgrading of qualifications for health workers in various fields.

The PES professional staff functions under the general direction of the Committee on Professional Education. During 1959 CPE appointed a subcommittee representing major programs and disciplines to help PES plan for future development of its expanding program.

PES's planning for 1960 and beyond includes: (1) as a major objective, the development of a program that will make it economically feasible for local health departments to use its services on a limited basis; (2) the obtaining of additional grant funds that will enable it to pioneer in developing examinations in new fields of public health; (3) an enlarged research program which will enable PES to achieve better insight into the complexities of evaluating knowledge and judgment at the professional level; a major step in this direction will be the installation of IBM electronic data processing equipment in February, 1960.

Historically PES tests have been devoted to objective evaluation of public health workers at different stages in their professional life rather than to the testing of academic accomplishment. However, the latter is a service that it could perform. During 1959 this was often proposed to PES by newly interested institutions as one of its possible future activities.

An important arm of PES and the Association is the personnel consultation program, available on a fee basis to any official public health agency interested in receiving help in their classification, salary, and recruitment programs. A strengthening of this activity is to be hoped and worked for to carry out the APHA's responsibility for improved personnel practices in public health.

Recruitment and Placement Service

In another approach to fostering higher qualifications in the profession, APHA continued to lend its full working support to the National Health Council's recruitment program for attracting students to the health fields from the secondary, college, and graduate school levels. It should be noted, too, that the APHA staff-operated placement service for both employers and applicants continues from the central office, via both personal correspondence and the Journal, with its monthly "Employment Service" section.

Continuing Education

The professional public health practitioner must keep pace—when he is not in fact setting it himself—with the continually developing body of knowledge in his and other disciplines. He does this by reading, by attending meetings and other educational excursions into new fields, and by informal exchanges of professional experiences with his colleagues. APHA provides in several ways for this kind of continuing education, professional stimulation, and improve-

ment. Of these ways, three in particular claim the attention of the staff.

American Journal of Public Health

The Journal completed its 49th year of continuous publication in 1959. The editor will call attention in the February, 1960, issue to the Journal's "Jubilee Year," noting the changes that have occurred in public health since 1910, the fact that the Journal has mirrored them all and that in so doing has contributed to the advancement of knowledge and to its effective application.

The editor read more than 250 papers from the Annual Meeting and other sources in 1959 and published 111. There were 154 orders for reprints involving a total of 230,300 copies, indicating for many articles a much wider distribution than at the time of publication. Articles and editorials are the province of the editor; the rest of each issue of the Journal is the responsibility of the administration staff. In 1959, pages of Journal text exceeded 1,800 and advertising pages amounted to 450.

The Annual Meeting

At the 87th Annual Meeting in Atlantic City, the theme of which was "Public Health Is One World," 87 international guests from all over the world were present and participating, largely through the efforts of President Leona Baumgartner.

More than 400 speakers contributed 225 papers and reports to 92 scientific sessions at the Annual Meeting. Committees of all sizes and of many origins held 82 meetings. The extensive program for Atlantic City was accumulated from more than 400 sources. Science writers converged upon the meeting and the daily press, periodicals, radio, and television brought its highlights to thousands of readers, viewers, and listeners.

The associate director and her staff again carried out the complex task of assigning time and meeting rooms to more than 300 events concentrated in a six-day period and in arranging for the more than 250 technical and scientific exhibits, which provided registrants with audio visual aids to continuing education. There were 4,800 persons registered at Atlantic City, 3,511 of them on the first day.

The highest honors in public health are bestowed at APHA's Annual Meeting. The 1959 Sedgwick Memorial Medal was awarded to Louis I. Dublin, Ph.D. Taking pleasure in departing from tradition, the Association gave a Presidential citation and award to Mary Lasker, president of the foundation which provides the APHA Lasker Awards, of which there were seven in 1959 (A.J.P.H. 49, 12:1686-1690, December, 1959).

Publications Service

During the year the central office distributed 40,000 copies of publications emanating from numerous APHA professional groups and committees to 10,600 purchasers. New editions of three manuals of practice were made ready for the printer, again under the authorship and guidance of expert committees. They were approved by the Governing Council at the Atlantic City Annual Meeting for promulgation by the Association.

To cite an outstanding publications activity, 41 state health departments have ordered 45,000 copies of APHA's all-time best seller "The Control of Communicable Diseases in Man," revised during 1959 for the 9th edition.

The Book Service department notes the continued popularity of such Association publications as "Recommended Methods for the Microbiological Examination of Foods," "Diagnostic Procedures for Virus and Rickettsial Diseases," and the housing series. (For further information on publications see the section on Professional Program below.)

Public Policy

With professional freedom comes the obligation to live up to professional ideals and to make commitments for action. American society depends for its best directions in public health on the informed and publicized opinion of the professional health worker as represented by APHA and its Affiliated Societies.

Through the Governing Council members of the APHA took stands on 18 different topics in 1959, thus adding to the growing body of APHA policy.

Given the complexities of public health and the long history of the Association which represents the profession, the job of making a concise but comprehensive résumé of APHA's policies over the years is as difficult as it is desirable. The task was begun in 1959, however, and is being completed under the guidance of the Committee on Public Policy and Legislation with the assistance of the director of the Washington office.

The Governing Council's policy determinations for the past ten years have been categorized and gaps pinpointed on matters of current public health significance. A number of these gaps were filled by APHA action in Atlantic City. The Association is thus able for the first time to present a reasonably clear-cut and comprehensive expression of its policy on most major areas in public health. A report will be published early in 1960.

During 1959 the Executive Board took special action on two areas calling for policy attention, drafting statements and securing Governing Council action on the population problem and the role of public health in medical care.

The 1959 Journal's five Legislative News sections show much about the volume, variety, and quality of the operations of the Washington Office, which has just completed its first full year of operation. Its existence has made better liaison and information services available to the Congress and federal agencies and enabled the American public health worker to be heard at the seat of national government. When legislative proposals of public health interest come before Congress the efforts of our Committee on Public Policy and Legislation and of the Washington Office director are directed at providing the legislature with expert testimony and relevant background data. The following is an indication of the scope of activities before the first session of the 86th Congress in 1959:

Subject of Testimony	APHA Representation
1. Federal loan program for construction of nonprofit nursing homes and homes for aged (H.R. 5941; no action).	Executive Director testified in person
2. Extension of Federal Air Pollution Law (four-year extension of P.L. 519 —84th Congress—voted)	Statement prepared and introduced into the record citing APHA 1958 resolution.
3. 1960 federal health appropriations (H.R. 6769, passed with compromise)	Comprehensive statement of APHA views on 23 program areas in the federal health budget placed on record.
4. Problems of the aged and aging (Hearing only; no bill)	Executive Director testified in person on current health activities directed at the problem of aging.
5. Forand Bill (H.R. 4700; no action)	Executive Director testified in person on the basis of 1958 action by Governing Council.

Subject of Testimony	APHA Representation
6. Automobile safety for federal vehicles (H.R. 1341; House action only) and safety measures on automobile exhausts (H.R. 1346; House action only)	Executive Director, in person, cited APHA 1958 resolution on seat belts and other studies on safety hazards from automobile exhausts.
7. Water Pollution control (H.R. 3610 amending P.L. 660; to conference for compromise)	Statement prepared and introduced into the record citing APHA 1958 resolution.
8. Public health traineeship program (H.R. 6871 and 6325; five-year extension of Titles I and II voted)	Executive Director, in person, citing the 1958 National Training Conference and APHA resolutions and Policy statements.

During the year several of our affiliates formalized their lines of communication with the Washington Office. APHA will continue to take proper opportunities in 1960 and the future to advise the American people and the Congress of what it considers sound and best for the nation's health.

Professional Program

APHA's professional program development parallels the work-patterns of its individual members. Each in his own area conceives, plans for, organizes, and carries out actions that will improve procedures, standards, and ability to promote personal and public health in as well balanced a manner as possible. This he does within the limitations of time, energy, available funds, and present gaps in scientific knowledge. In its program development APHA draws on association-wide resources to reduce these limitations and directs its attention to providing the members with newer starting points in their programs.

APHA Sections and committees have always worked to this end. However, the Association has given a specific charge to the Technical Development Board and the Program Area Committees to support the member in his search for new ways to protect and promote health. TDB is well aware of the fact that its ability to function depends on the high quality of support it in turn receives from the members in all reaches of the Association.

A major staff responsibility is to help implement the TDB's assigned task of "initiating and assisting in the development of balanced activities . . . and in coordination of committee activities." The deputy executive director keeps in close touch with all aspects of the work of Program Area Committees. He assists in planning agenda, participates at meetings, and reviews manuscripts or other products of committee action. In general he carries out the important function of relating each Program Area Committee's work to all the others, as each develops new concepts and clearer perspectives . . . that nothing be lost and that duplication be avoided.

A great deal of background preparation by staff in APHA program development is required. The work of compiling and maintaining a current "Index of Association Activity" is but one example of the staff's service in helping to coordinate the programming efforts of the Association. The TDB, the Standing Committee on Evaluation and Standards, and the staff use the Index as a guide for carrying on "balanced activities" within APHA.

A brief summary follows of many of these activities which came to fruition during 1959.

Technical Development Board

The TDB acts as a creative entity in itself. Its statement, begun in 1959, on "Broadened Spectrum of Health and Morbidity" will give clearer focus and definition to many concerns of public health workers. TDB has also proposed a volume on "Health Aspects of Air Pollution" which will deal with the expansion of public health programs in that field. The 1959 TDB Report to the Governing Council, soon to be published, describes a desirable long-range program for APHA based on changes in our way of life and their effect on people, housing, and community development, and outlines some elements of a research program for APHA.

Program Areas

A unique and desirable feature of APHA's Program Area Committees and working parties is that members are drawn from the wide spectrum of APHA Sections. APHA is thus able to mobilize multidisciplined skills in its attack on multifaceted public health problems. The results of these efforts carry weight in widely various ways; a review of the TDB Report to the Governing Council will indicate many of them. The visible results, to which this report is limited, usually take the form of publications for the use of the profession. During 1959 committees moved forward on or completed work in the areas listed below:

Accident Prevention — preparation of "The Role of Public Health Workers and Physicians in Accident Prevention," to be published in 1961.

Child Health—"Services for Children with Heart Disease and Rheumatic Fever" completed; near completion, a guide on emotional disturbances and another on orthopedic handicaps; all three to be published in 1960.

Chronic Disease and Rehabilitation—new volume in "Elements of a Chronic Disease Program for State and Local Health Departments," to be published in 1960.

Environmental Health—"Radiological Health Practice: A Guide for Public Health Administrators" was published in 1959 as a companion volume to "Public Exposure to Ionizing Radiation," issued in 1958.

Medical Care—the 1959 Policy Statement adopted by the Governing Council on "The Public Health Role in Medical Care" (referred to above) is printed in full in the December, 1959, issue of the A.J.P.H. A "Prospectus for a Medical Care Study" by the APHA was developed in 1959 and will form the basis for an application for a grant-in-aid to carry out the proposed study.

Mental Health—work continued on the preparation of "Guide to Control Methods for Mental Disorders" with issue slated for 1961; made possible by a special grant from the National Institute of Mental Health.

Public Health Administration—during the year study was devoted to several types of activities for surveying community health services. "Guide to a Community Health Study," devised for lay groups who may seek professional assistance, is to go to press early in 1960. A manual for professional people is "Health Practice Indices," now well into the planning stage. "Administration of Community Health Services" is scheduled to be published in 1960. A survey of Bridgeport, Connecticut's, health services was completed and reported during the year before the APHA field director resigned to assume another position.

Among the results of "working party" program activity during the year was the formation of two new committees: the Chronic Disease and Rehabilitation Committee now has a Subcommittee on Chronic Alcoholism with a set of guiding concepts, goals, and specific recommended activities; and there is a new Program Area Committee on Health Services in Disaster, which will suggest methods to cope with the effects of major civilian or enemy-wrought disaster.

During 1959 APHA's engineering associate assisted the responsible subcommittees of the Committee on Evaluation and Standards in preparing for the following major publications:

Control of Nutritional Diseases (1st Edition), 1960.

Control of Communicable Diseases in Man* (9th Edition), 1960.

Standard Methods for the Examination of Dairy Products (11th Edition), 1960. (50th year of publication.)

Standard Methods for the Examination of Water, Sewage, and Industrial Wastes (11th Edition), 1960, in collaboration with the American Water Works Association and the Water Pollution Control Federation (until recently the Federation of Sewage and Industrial Wastes Associations).

Bacteriological Methods for Examination of Shellfish and Shellfish Waters is being prepared for 1961.

Research Projects

APHA sponsors full-time research principally to provide its members and all public health workers with new and tested information for their own use in program development. When APHA substantiates both the need for special researches and its capability for engaging in them, foundation and federal sources give encouraging financial support.

During 1959 APHA received: (1) a two-year extension of the grant for the University of North Carolina study into reasons medical personnel select specialties, with special emphasis on why they enter and remain in public health; (2) an initial grant for PES to develop special technics for providing a testing program in the field of vocational rehabilitation counseling; (3) an initial grant to a subcommittee of the Statistics Section interested in producing early monographs relating health indexes to the new decennial census data; (4) continued support for the development of a series of guides for mental health activities in public health; and (5) continuation of support for a project to study how the technics of behavioral science can be applied to public health practice, together with a supplemental grant from another source to provide a field station in Philadelphia for this project.

The value of this operational research can be illustrated by a brief review of the behavioral science project, which originated from a joint effort by APHA and the three major social science associations.† The grant permitted APHA to secure the full-time services of a qualified social scientist, with experience in a local health department, and academic training in public health. Among many worth-while accomplishments to come out of this project in 1959:

- Project staff prepared a compendium or "bookshelf" of social science reading sources of special interest to public health people; this was published in the Journal.
- Staff arranged an institute for our affiliated agencies and leading public health administrators in the New England region with special emphasis on the interrelationships between the behavioral sciences and public health. The results were considered most rewarding. Others have requested similar programs.
- The social scientist attached to our staff has been widely sought as a participant at Affiliated Societies' meetings to explore the field of this study with them. It becomes more apparent daily that public health workers' interest in the contributions of the behavioral sciences to their practice has significantly increased. The staffing of the field station by a social anthropologist at the beginning of the coming year should add even more to the value of the present demonstration.

* Approved in principle by the Public Health Service, the Surgeons General of the Army, Navy, and Air Force, and endorsed by the Association of State and Territorial Health Officers. The British Ministry of Health for England and Wales and the Department of Health for Scotland have accepted its substance, allowing for differences in legislative and administrative practice in Great Britain. This book has been translated into nine languages.

† The American Anthropological, Psychological and Sociological Associations. This is one of APHA's eight Joint Committees. Others are with the American Board of Preventive Medicine; the American Public Welfare Association; National Social Welfare Assembly, and National Association of Housing and Redevelopment Officials; Association of Schools of Public Health; ASTHO (2); American Hospital Association; and National Association of Sanitarians and International Association of Milk and Food Sanitarians.

In the Professional Community

A brief description of APHA program development would be incomplete without the note that in 1959 the public health viewpoint was heard in the councils of more than 30 professional related organizations. APHA representatives are invited to meet regularly with committees of these organizations. The purposes of their missions vary. In many of their sessions with other groups, for example, our members made substantive contributions in 1959 to the work of such professional societies as the American Academy of Pediatrics and the American Public Welfare Association. In all cases, Association representatives—whether appointed or staff—whether at national or local meetings—were carrying the voice of public health beyond the confines of our own Association, and bringing back to us the current thinking of other professional groups whose function, like ours, is to serve the total community better.

Financial Report

The financial history of the Association for the year 1959 follows on pages 394-396. It will be seen that it takes many more dollars to carry on the operation of the Association than are obtained by membership dues which represent 25 per cent of the total budget. For every dollar of membership dues, three additional dollars must come from other sources.

THE AMERICAN PUBLIC HEALTH ASSOCIATION, INC.

Statement of Income and Expense

January 1, 1959—December 31, 1959

Association Income	
Membership	$169,871.15
Journal	135,243.99
Publications	49,354.39
Annual Meeting	66,987.27
Miscellaneous	18,052.62
Bridgeport Survey	9,267.97
Lasker Foundation	5,523.26
Rockefeller Foundation	53,535.75
Kellogg Foundation	50,201.61
Western Branch	7,438.46
Milbank Memorial Fund	30,000.00
New York Foundation	5,000.00
Ittleson Publications	2,759.30
Total Income Association Activities (excluding special projects)	$603,235.77
Association Activities Expense (excluding special projects)	
A. Personnel	
Staff salaries, retirement, Social Security	$322,499.18
Consultants salaries	4,350.00
B. Expenses (staff)	
Rent	20,683.94
Travel	19,514.13
Maintenance	18,394.49
Expenses (officers and committees)	
Travel and subsistence	22,971.24
Maintenance	6,624.62
C. Equipment and Supplies	
Office equipment and supplies	31,179.08
Printing	112,326.81
Rebates to Affiliated Societies	4,500.00
Library service, National Health Council	6,100.00
Program contribution, National Health Council	6,400.00
Rental exhibit space and meeting rooms, exhibit construction, projection, etc.	12,295.35
Discounts to agencies, subscriptions, advertising, child health books	15,208.49
Total Expense Association Activities (excluding special projects)	$603,047.33
SPECIAL PROJECTS	
Professional Examination Service	
A. Personnel	
Staff salaries, retirement, Social Security	$150,972.11
Consultants salaries	15,864.21
B. Expenses (staff)	
Rent	18,656.10
Travel	7,334.90
Maintenance	10,595.97
Expenses (officers and committees)	
Travel	633.78
Maintenance	2,095.00
C. Equipment and Supplies	
Equipment	8,531.22
Supplies	8,239.55
Total Expense Professional Examination Service	$222,922.84
Income from Annual Service Plan and Licensing Examinations	$222,922.84

A Study of Factors Influencing Recruitment of Physicians to Public Health

A. Personnel	
Staff salaries, retirement, Social Security	$ 44,790.20
Consultants salaries	3,975.86
B. Expenses (staff)	
Rent and indirect cost	8,216.20
Travel	2,341.73
Maintenance	1,029.24
C. Equipment and Supplies	
Equipment and supplies	2,335.08
Printing	11,809.46
Total Expense	$ 74,497.77
Income from National Institutes of Health	$ 74,497.77

A Guide to Control Methods for Mental Disorders

A. Personnel	
Salaries, retirement, Social Security	$ 5,580.67
B. Expenses (staff)	
Travel	157.21
Maintenance and rent	1,305.94
Expenses (officers and committees)	
Travel	4,094.30
C. Equipment and Supplies	573.33
Total Expense	$ 11,711.45
Income from National Institutes of Health	$ 11,711.45

The Development and Use of Objective Examinations in the Evaluation of Professional Knowledge, Skills and Attitudes of Rehabilitation Workers

A. Personnel	
Staff salaries, retirement, Social Security	$ 4,716.90
Consultants salaries	698.28
B. Expenses (staff)	
Rent	1,149.03
Travel	21.32
Maintenance	161.15
Expenses (officers and committees)	
Travel	38.40
C. Equipment and Supplies	140.75
Total Expense	$ 6,925.83
Income from Department of Health, Education and Welfare	$ 6,925.83

Control of Communicable Diseases in Man, Publication Revision

A. Personnel	
Staff salaries	$ 100.00
B. Expenses (staff)	
Maintenance	105.90
Expenses (officers and committees)	
Travel	1,347.16
Total Expense	$ 1,553.06
Income from National Institutes of Health	$ 1,553.06

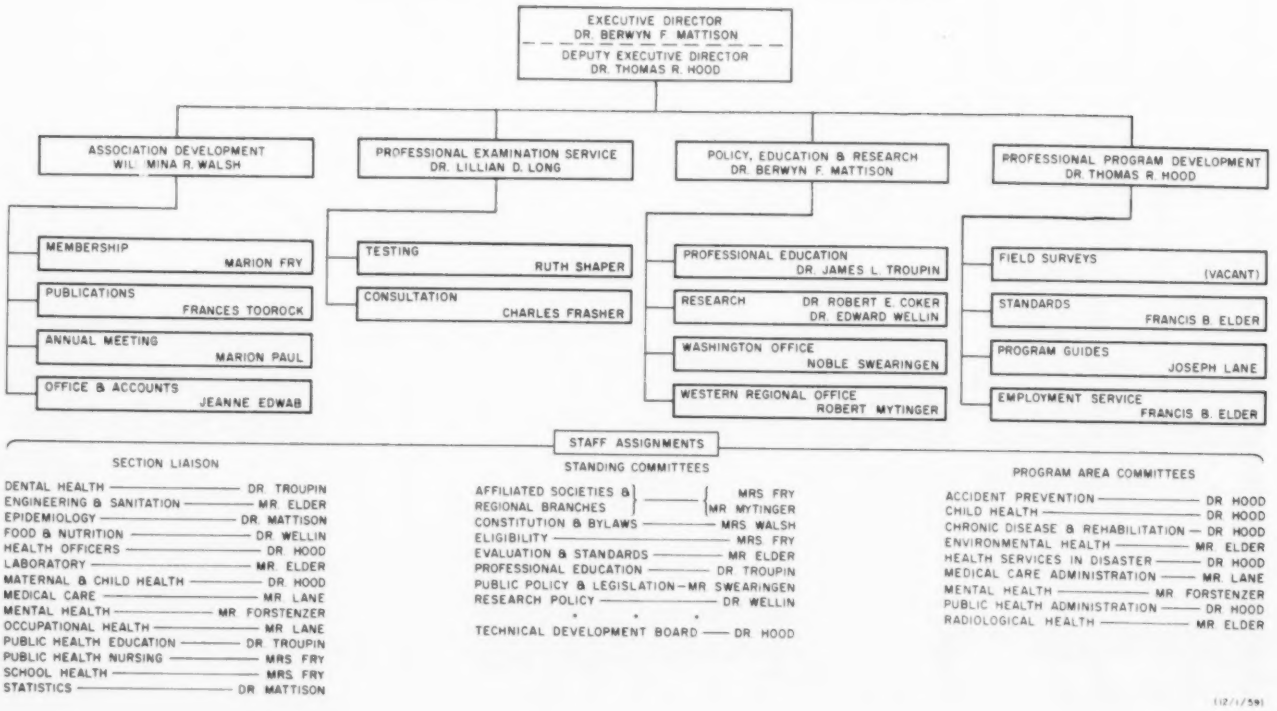
Studies in Public Health and the Behavioral Sciences	
A. Personnel	
Staff salaries, retirement, Social Security	$ 16,396.71
B. Expenses (staff)	
Rent	3,052.29
Travel	1,295.03
Maintenance	1,040.78
Expenses (officers and committees)	
Travel	903.53
C. Equipment and Supplies	1,300.75
Total Expense	$ 23,989.09
Income from National Institutes of Health	$ 23,989.09
Social Science and Public Health (Philadelphia Study)	
A. Personnel	
Staff salaries, retirement, Social Security	$ 1,067.71
Total Expense	$ 1,067.71
Income from Russell Sage Foundation	$ 1,067.71
Monograph Series on Vital and Health Statistics	
B. Expenses (staff)	
Travel	$ 20.84
Income Rockefeller Foundation	$ 20.84

RECONCILIATION

	1959 Expense	1959 Income	1959 Expense	1959 Income
Association Activities			$603,047.33	$603,235.77
General	$429,918.04	$437,547.91		
Task Force Implementation	154,475.44	146,175.82		
Surveys and Awards	18,653.85	19,512.64		
Professional Examination Service			222,922.84	222,922.84
Special Projects				
Recruitment Study			74,497.77	74,497.77
Mental Health Project			11,711.45	11,711.45
Vocational Rehabilitation Project			6,925.83	6,925.83
Publication Revision			1,553.06	1,553.06
Behavioral Sciences Study			23,989.09	23,989.09
Social Science Study Philadelphia			1,067.71	1,067.71
Monograph Series			20.84	20.84
GRAND TOTAL OF INCOME AND EXPENSE			$945,735.92	$945,924.36

AMERICAN PUBLIC HEALTH ASSOCIATION

ADMINISTRATIVE STAFF ACTIVITIES CHART



SECTION LIAISON

DENTAL HEALTH	DR. TROUPIN
ENGINEERING & SANITATION	MR. ELDER
EPIDEMIOLOGY	DR. MATTISON
FOOD & NUTRITION	DR. WELLIN
HEALTH OFFICERS	DR. HOOD
LABORATORY	MR. ELDER
MATERNAL & CHILD HEALTH	DR. HOOD
MEDICAL CARE	MR. LANE
MENTAL HEALTH	MR. FORSTENZER
OCCUPATIONAL HEALTH	MR. LANE
PUBLIC HEALTH EDUCATION	DR. TROUPIN
PUBLIC HEALTH NURSING	MRS. FRY
SCHOOL HEALTH	MRS. FRY
STATISTICS	DR. MATTISON

STANDING COMMITTEES

AFFILIATED SOCIETIES & REGIONAL BRANCHES	MRS. FRY / MR. MYTINGER
CONSTITUTION & BYLAWS	MRS. WALSH
ELIGIBILITY	MRS. FRY
EVALUATION & STANDARDS	MR. ELDER
PROFESSIONAL EDUCATION	DR. TROUPIN
PUBLIC POLICY & LEGISLATION	MR. SWEARINGEN
RESEARCH POLICY	DR. WELLIN
TECHNICAL DEVELOPMENT BOARD	DR. HOOD

PROGRAM AREA COMMITTEES

ACCIDENT PREVENTION	DR. HOOD
CHILD HEALTH	DR. HOOD
CHRONIC DISEASE & REHABILITATION	DR. HOOD
ENVIRONMENTAL HEALTH	MR. ELDER
HEALTH SERVICES IN DISASTER	DR. HOOD
MEDICAL CARE ADMINISTRATION	MR. LANE
MENTAL HEALTH	MR. FORSTENZER
PUBLIC HEALTH ADMINISTRATION	DR. HOOD
RADIOLOGICAL HEALTH	MR. ELDER

(12/1/59)

ASSOCIATION NEWS

APHA ANNUAL MEETINGS

1960—October 31-November 4—San Francisco, Calif.
1961—November 13-November 17—Detroit, Mich.

PRESIDENTS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

* Stephen Smith, M.D., New York, N. Y. 1872, 1873, 1874
* Joseph M. Toner, M.D., Washington, D. C. 1875
* Edwin M. Snow, M.D., Providence, R. I. 1876
* John Henry Rauch, M.D., Springfield, Ill. 1877
* Elisha Harris, M.D., New York, N. Y. 1878
* James Lawrence Cabell, M.D., Charlottesville, Va. 1879
* John Shaw Billings, M.D., Washington, D. C. 1880
* Charles B. White, M.D., New Orleans, La. 1881
* Robert C. Kedzie, M.D., Lansing, Mich. 1882
* Ezra M. Hunt, M.D., Trenton, N. J. 1883
* Albert L. Gihon, M.D., Washington, D. C. 1884
* James E. Reeves, M.D., Wheeling, W. Va. 1885
* Henry P. Walcott, M.D., Cambridge, Mass. 1886
* George M. Sternberg, M.D., Washington, D. C. 1887
* Charles N. Hewitt, M.D., Red Wing, Minn. 1888
* Hosmer A. Johnson, M.D., Chicago, Ill. 1889
* Henry B. Baker, M.D., Lansing, Mich. 1890
* Frederick Montizambert, M.D., Quebec, Canada 1891
* Felix Formento, M.D., New Orleans, La. 1892
* Samuel H. Durgin, M.D., Boston, Mass. 1893
* E. Persiller-Lachapelle, M.D., Montreal, Canada 1894
* William Bailey, M.D., Louisville, Ky. 1895
* Eduardo Liceaga, M.D., Mexico City, Mexico 1896
* Henry B. Horlbeck, M.D., Charleston, S. C. 1897
* Charles A. Lindsey, M.D., New Haven, Conn. 1898
* Henry Mitchell, M.D., Trenton, N. J. 1899
* Peter H. Bryce, M.D., Toronto, Ont., Canada 1900
* Benjamin Lee, M.D., Philadelphia, Pa. 1901
* Henry D. Holton, M.D., Brattleboro, Vt. 1902
* Walter Wyman, M.D., Washington, D. C. 1903
* Carlos J. Finlay, M.D., Havana, Cuba 1904
* Frank F. Wesbrook, M.D., Minneapolis, Minn. 1905
* Franklin C. Robinson, LL.D., Brunswick, Me. 1906
* Domingo Orvananos, M.D., Mexico City, Mexico 1907
* Richard H. Lewis, M.D., Raleigh, N. C. 1908
* Gardner T. Swarts, M.D., Providence, R. I. 1909
* Charles O. Probst, M.D., Columbus, Ohio 1910
* Robert M. Simpson, M.D., Winnipeg, Manitoba, Canada 1911
* J. N. Hurty, M.D., Indianapolis, Ind. 1912
* Rudolph Hering, Sc.D., New York, N. Y. 1913
* W. C. Woodward, M.D., Washington, D. C. 1914
* William T. Sedgwick, Sc.D., Boston, Mass. 1915
* John F. Anderson, M.D., Washington, D. C. 1916
* W. A. Evans, M.D., Chicago, Ill. 1917
* Charles J. Hastings, M.D., Toronto, Ontario, Canada 1918
* Lee K. Frankel, Ph.D., New York, N. Y. 1919
W. S. Rankin, M.D., Raleigh, N. C. .. 1920
* Mazyck P. Ravenel, M.D., Columbia, Mo. 1921
Allan J. McLaughlin, M.D., Washington, D. C. 1922
* E. C. Levy, M.D., Richmond, Va. 1923

* Deceased

PRESIDENTS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION (Cont.)

* William H. Park, M.D., New York, N. Y. 1924
Henry F. Vaughan, Dr.P.H., Detroit, Mich. 1925
* C.-E. A. Winslow, Dr.P.H., New Haven, Conn. 1926
* Charles V. Chapin, M.D., Providence, R. I. 1927
Herman H. Bundesen, M.D., Chicago, Ill. 1928
* George W. Fuller, New York, N. Y. 1929
* A. J. Chesley, M.D., St. Paul, Minn. 1930
* Hugh S. Cumming, M.D., Washington, D. C. 1931
Louis I. Dublin, Ph.D., New York, N. Y. 1932
John A. Ferrell, M.D., New York, N. Y. 1933
* Haven Emerson, M.D., New York, N. Y. 1934
* Eugene L. Bishop, M.D., Nashville, Tenn. 1935
Walter H. Brown, M.D., Palo Alto, Calif. 1936
Thomas Parran, M.D., Albany, N. Y. 1937
* Arthur T. McCormack, M.D., Louisville, Ky. 1938
Abel Wolman, Dr.Eng., Baltimore, Md. 1939
Edward S. Godfrey, Jr., M.D., Albany, N. Y. 1940
* W. S. Leathers, M.D., Nashville, Tenn. 1941
John L. Rice, M.D., New York, N. Y. 1942
* Allen W. Freeman, M.D., Baltimore, Md. 1943
* Felix J. Underwood, M.D., Jackson, Miss. 1944
* John J. Sippy, M.D., Stockton, Calif. 1945–1946
Harry S. Mustard, M.D., New York, N. Y. 1947
Martha M. Eliot, M.D., Washington, D. C. 1948
Charles F. Wilinsky, M.D., Boston, Mass. 1949
Lowell J. Reed, Ph.D., Baltimore, Md. 1950
William P. Shepard, M.D., San Francisco, Calif. 1951
Gaylord W. Anderson, M.D., Minneapolis, Minn. 1952
Wilton L. Halverson, M.D., San Francisco, Calif. 1953
Hugh R. Leavell, M.D., Boston, Mass. 1954
Herman E. Hilleboe, M.D., Albany, N. Y. 1955
Ira V. Hiscock, Sc.D., New Haven, Conn. 1956
John W. Knutson, D.D.S., Washington, D. C. 1957
Roy J. Morton, C.E., Oak Ridge, Tenn. 1958
Leona Baumgartner, M.D., New York, N. Y. 1959
Malcolm H. Merrill, M.D., Berkeley, Calif. 1960

* Deceased

RECIPIENTS OF THE SEDGWICK MEMORIAL MEDAL

Granted "for distinguished service in public health":

1929 Charles V. Chapin, M.D.*
1930 Theobald Smith, M.D.*
1931 George W. McCoy, M.D.*
1932 William H. Park, M.D.*
1933 Milton J. Rosenau, M.D.*
1934 Professor Edwin O. Jordan*
1935 Haven Emerson, M.D.*
1936 Frederick F. Russell, M.D.
1937 No award
1938 Wade H. Frost, M.D.*
1939 Thomas Parran, M.D.
1940 Hans Zinsser, M.D.*
1941 Charles Armstrong, M.D.
1942 C.-E. A. Winslow, Dr.P.H.*
1943 Brig. Gen. James S. Simmons, M.C.*
1944 Ernest W. Goodpasture, M.D.
1945 No award
1946 Karl F. Meyer, M.D.
1947 Reginald M. Atwater, M.D.*
1948 Abel Wolman, Dr.Eng.
1949 Henry F. Vaughan, Dr.P.H.
1950 Rolla Eugene Dyer, M.D.
1951 Edward S. Godfrey, Jr., M.D.
1952 Kenneth F. Maxcy, M.D.
1953 Carl E. Buck, Dr.P.H.*
1954 Wilson G. Smillie, M.D.
1955 Albert J. Chesley, M.D.*
1956 Frederick W. Jackson, M.D.*
1957 Lowell J. Reed, Ph.D.
1958 Martha M. Eliot, M.D.
1959 Louis I. Dublin, Ph.D.

* Deceased

RECIPIENTS OF THE LASKER AWARDS

The American Public Health Association, through the presentation of the Albert Lasker Awards, acknowledges outstanding contributions to scientific research related to diseases which are the most frequent causes of death and disability, and for distinguished services in the field of public health.

For 1946:
Carl Ferdinand Cori, M.D.
Alexander S. Weiner, M.D., Philip Levine, M.D., and Karl Landsteiner, Ph.D. (posthumously), jointly
John Friend Mahoney, M.D.
Alfred Newton Richards, Ph.D.
Fred L. Soper, M.D.

The following groups were cited:
The Army Epidemiological Board
The Board for the Coordination of Malarial Studies
The Bureau of Entomology and Plant Quarantine
The National Institutes of Health
The Northern Regional Research Laboratory

For 1947:
Oswald T. Avery, M.D.
Thomas Francis, Jr., M.D.
Homer Smith, D.Sc.
Alice Hamilton, M.D.
Thomas Parran, M.D.

The following groups were cited:
The British Ministries of Food and Health
The United States Committee on Joint Causes of Death

For 1948:
Selman A. Waksman, Ph.D., and Rene J. Dubos, M.D., jointly
Vincent du Vigneaud, Ph.D.
Martha M. Eliot, M.D.
R. E. Dyer, M.D.

The following group was cited:
The Department of Medicine and Surgery, Veterans Administration, Paul R. Hawley, M.D., and Paul B. Magnuson, M.D.

For 1949:
Haven Emerson, M.D.
Andre Cournand, M.D.
Marion W. Sheahan, R.N.
Max Theiler, L.R.C.P.
William S. Tillett, M.D., and L. R. Christensen, M.D., jointly
Edward C. Kendall, Ph.D., and Philip S. Hench, M.D., jointly

The following groups were cited:
The American Academy of Pediatrics
The Life Insurance Medical Research Fund

For 1950:
George Wells Beadle, Ph.D.
Eugene L. Bishop, M.D.
George Papanicolaou, M.D.

The following group was cited:
The International Health Division of the Rockefeller Foundation

For 1951:
Karl F. Meyer, M.D.
Florence R. Sabin, M.D.
William Gordon Lennox, M.D., and Frederic Andrews Gibbs, M.D., jointly
Elsie L'Esperance, M.D., and Catharine Macfarlane, M.D., jointly

The following groups were cited:
Alcoholics Anonymous
Health Insurance Plan of Greater New York

For 1952:
G. Brock Chisholm, M.D.
Howard A. Rusk, M.D.
F. Macfarlane Burnet, M.D.
Conrad A. Elvehjem, Ph.D.
C.-E. A. Winslow, Dr.P.H., *Special Award*
Frederick S. McKay, D.D.S., and H. Trendley Dean, D.D.S., jointly

For 1953:
Hans A. Krebs, Ph.D.
Michael Heidelberger, Ph.D.
George Wald, Ph.D.
Earle Phelps, C.E.
Felix Underwood, M.D.

The following groups were cited:
Division of Research Grants, National Institutes of Health
University Laboratory of Physical Chemistry Related to Medicine, Harvard University

For 1954:
Leona Baumgartner, M.D.
Edwin B. Astwood, M.D.
John F. Enders, Ph.D.
Alfred Blalock, M.D., Helen B. Taussig, M.D., and Robert E. Gross, M.D., jointly

The following group was cited:
Streptococcal Disease Laboratory, Armed Forces Epidemiological Board, Francis E. Warren Air Force Base, Charles H. Rammelkamp, Jr., M.D.

RECIPIENTS OF THE LASKER AWARDS (Cont.)

For 1955:

Robert D. Defries, M.D.

Karl Paul Link, Ph.D.

C. Walton Lillehei, M.D., Morley Cohen, M.D., Herbert Warden, M.D., and Richard L. Varco, M.D., jointly

The following groups were cited:

The Menninger Foundation—Drs. Karl and William Menninger.

Nursing Services of the U. S. Public Health Service—Lucile Petry Leone, R.N., Pearl McIver, R.N., and Margaret G. Arnstein, R.N.

The Hoffmann-LaRoche Research Laboratories, The Squibb Institute for Medical Research, Edward H. Robitzek, M.D., Irving Selikoff, M.D., Walsh McDermott, M.D., and Carl Muschenheim, M.D.

For 1956:

Alan Gregg, M.D., *Special Award*

Jonas E. Salk, M.D.

William P. Shepard, M.D.

V. Everett Kinsey, Ph.D., and Arnall Patz, M.D., jointly

Karl Meyer, M.D., and Francis O. Schmitt, D.Sc., jointly

The following groups were cited:

The Food and Drug Administration, United States Department of Health, Education and Welfare

United Mine Workers of America Welfare and Retirement Fund

For 1957:

Reginald M. Atwater, M.D. (posthumously)

Frank G. Boudreau, M.D.

C. J. Van Slyke, M.D.

Richard E. Shope, M.D.

Rustom Jal Vakil, M.D., Nathan S. Kline, M.D., Robert H. Noce, M.D., Henri Laborit, M.D., Pierre Deniker, M.D., and H. E. Lehmann, M.D., jointly

For 1958:

Basil O'Connor

Robert W. Wilkins, M.D.

Peyton Rous, M.D.

Theodore Puck, Ph.D.

Alfred D. Hershey, Ph.D., Gerhard Schramm, Ph.D., and Heinz Fraenkel-Conrat, M.D., Ph.D., *Special Joint Award*

For 1959:

Albert Coons, M.D.

Gilbert Dalldorf, M.D.

Jules Freund, M.D.

John Holmes Dingle, M.D.

Maurice Pate

Senator Lister Hill and Congressman John E. Fogarty, *Special Awards for Extraordinary Public Service*

ANNUAL MEETINGS

Preliminary Meeting	New York, N. Y., April 18	1872
"	Long Branch, N. J., September 12	1872
Annual Meeting		
1st	Cincinnati, Ohio, May 1–3	1873
2nd	New York, N. Y., November 11–14	1873
3rd	Philadelphia, Pa.	1874
4th	Baltimore, Md.	1875
5th	Boston, Mass.	1876
6th	Chicago, Ill.	1877
7th	Richmond, Va.	1878
8th	Nashville, Tenn.	1879
9th	New Orleans, La.	1880
10th	Savannah, Ga.	1881
11th	Indianapolis, Ind.	1882
12th	Detroit, Mich.	1883
13th	St. Louis, Mo.	1884
14th	Washington, D. C.	1885
15th	Toronto, Ont., Canada	1886
16th	Memphis, Tenn.	1887

ANNUAL MEETINGS (Cont.)

Annual Meeting		
17th	Milwaukee, Wis.	1888
18th	Brooklyn, N. Y.	1889
19th	Charleston, S. C.	1890
20th	Kansas City, Mo.	1891
21st	Mexico City, Mex.	1892
22nd	Chicago, Ill.	1893
23rd	Montreal, Que., Canada	1894
24th	Denver, Colo.	1895
25th	Buffalo, N. Y.	1896
26th	Philadelphia, Pa.	1897
27th	Ottawa, Ont., Canada	1898
28th	Minneapolis, Minn.	1899
29th	Indianapolis, Ind.	1900
30th	Buffalo, N. Y.	1901
31st	New Orleans, La.	1902
32nd	Washington, D. C.	1903
33rd	Havana, Cuba	1904
34th	Boston, Mass.	1905
35th	Mexico City, Mex.	1906
36th	Atlantic City, N. J.	1907
37th	Winnipeg, Man., Canada	1908
38th	Richmond, Va.	1909
39th	Milwaukee, Wis.	1910
40th	Havana, Cuba	1911
41st	Washington, D. C.	1912
42nd	Colorado Springs, Colo.	1913
43rd	Jacksonville, Fla.	1914
44th	Rochester, N. Y.	1915
45th	Cincinnati, Ohio	1916
46th	Washington, D. C.	1917
47th	Chicago, Ill.	1918
48th	New Orleans, La.	1919
49th	San Francisco, Calif.	1920
50th	New York, N. Y.	1921
51st	Cleveland, Ohio	1922
52nd	Boston, Mass.	1923
53rd	Detroit, Mich.	1924
54th	St. Louis, Mo.	1925
55th	Buffalo, N. Y.	1926
56th	Cincinnati, Ohio	1927
57th	Chicago, Ill.	1928
58th	Minneapolis, Minn.	1929
59th	Fort Worth, Tex.*	1930
60th	Montreal, Que., Canada	1931
61st	Washington, D. C.	1932
62nd	Indianapolis, Ind.	1933
63rd	Pasadena, Calif.	1934
64th	Milwaukee, Wis.	1935
65th	New Orleans, La.†	1936
66th	New York, N. Y.	1937
67th	Kansas City, Mo.	1938
68th	Pittsburgh, Pa.	1939
69th	Detroit, Mich.	1940
70th	Atlantic City, N. J.	1941

* Post-Convention Meeting, Mexico City, Mex., 1930.

† Post-Convention Meeting, Havana, Cuba, 1936.

ANNUAL MEETINGS (Cont.)

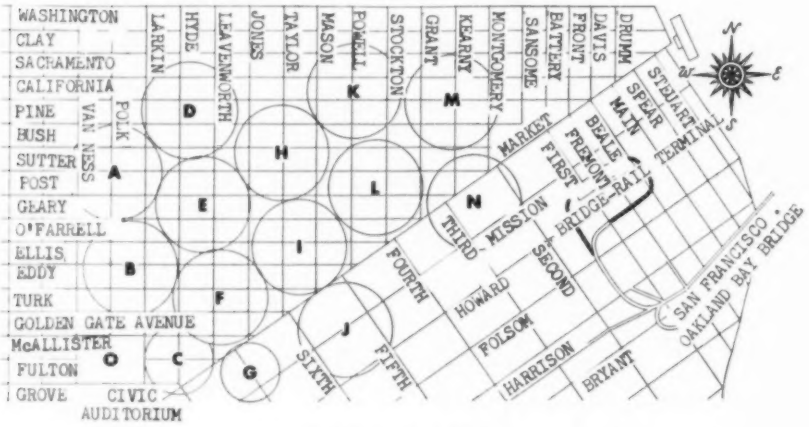
Annual Meeting		
71st	St. Louis, Mo.	1942
72nd	(Wartime Conference) New York, N. Y.	1943
73rd	(Wartime Conference) New York, N. Y.	1944
	No Meeting	1945
74th	Cleveland, Ohio	1946
75th	Atlantic City, N. J.	1947
76th	Boston, Mass.	1948
77th	New York, N. Y.*	1949
78th	St. Louis, Mo.	1950
79th	San Francisco, Calif.	1951
80th	Cleveland, Ohio	1952
81st	New York, N. Y.	1953
82nd	Buffalo, N. Y.	1954
83rd	Kansas City, Mo.	1955
84th	Atlantic City, N. J.	1956
85th	Cleveland, Ohio	1957
86th	St. Louis, Mo.	1958
87th	Atlantic City, N. J.	1959
88th	San Francisco, Calif.	1960

* Post-Convention Meeting, Bermuda Cruise, 1949.

Correction

Because of the late receipt of an official notice of his death the name of Thomas Fansler was not included in the "In Memoriam Resolution" printed in the December Journal. The Managing Editor, on behalf of the Association, notes this omission with regret.

Street Plan of San Francisco Showing Location of Civic Auditorium and Housing Bureau Hotels (Letter indicates Zone)



HOTELS AND RATES

Zone	Hotel	Single	Double	Twin Beds	Parlor Suite
E	Alexander Hamilton	$10.00–14.50	$13.00–18.50	$13.00–18.50	$20.00–60.00
H	Bellevue	8.00–10.00	10.00–12.00	12.00–15.00	20.00–25.00
L	Beresford	4.75– 5.50	6.00– 6.75	6.50– 7.00	
M	Beverly Plaza	7.00– 8.00	10.00–11.00	10.00–12.00	20.00–
A	Broadmoor	7.00–	8.00–	10.00–	
I	Californian	8.50–11.00	10.50–13.50	11.50–14.00	22.00–25.00
H	Canterbury	10.00–17.00	12.00–19.00	14.00–20.00	25.00–40.00
L	Cartwright	6.50–	7.50–	8.50–	
H	Cecil	7.50– 8.50	9.50–10.50	11.00–12.00	
L	Chancellor	7.00–	9.00–	10.00–	
H	Clift	13.00–21.00		16.00–23.00	41.00–50.00
K	Colonial	8.00–12.00	12.00–15.00	15.00–20.00	20.00–25.00
H	Commodore	6.00–12.00	8.00–14.00	10.00–16.00	
L	Devonshire	6.00– 6.50	7.50– 8.50	8.50–10.00	
L	Drake Wiltshire	10.00–11.00	12.00–14.00	15.00–16.00	25.00–35.00
H	El Cortez	8.00–10.00	10.00–12.00	11.00–14.00	20.00–26.00
F	Federal	3.00– 5.50	4.00– 7.00	4.50– 7.00	
L	Fielding	6.00– 8.00	8.00–10.00	9.00–12.00	20.00–25.00
L	Franciscan	7.00–	9.00–	12.00–	18.00–
H	Gaylord	8.00–	10.00–	12.00–	25.00–
L	Golden State	5.00– 6.00	7.00– 8.00	8.50– 9.00	
K	Grant	5.50–	8.00–	9.00–	
A	Jack Tar	10.00–20.00	12.00–22.00	16.00–26.00	32.00–80.00
L	King George	6.00– 8.00	8.00–10.00	10.00–14.00	20.00–
J	Lankershim	4.00– 5.50	5.00– 7.00	6.50– 8.00	
F	La Salle	6.00–	7.00–	8.00–	15.00–
A	Leland	4.00– 6.50	5.00– 8.50	7.00–10.00	
L	Manx	8.00–11.00	10.00–12.00	11.00–13.00	20.00–25.00
K	Mark Hopkins	15.00–19.00	19.00–23.00	19.00–23.00	38.00–75.00
H	Maurice	6.00– 9.00	8.50–10.50	9.00–11.50	17.50–18.50
J	Olympic	5.50– 8.50	7.50–11.00	8.50–10.00	
J	Oxford	7.00– 8.00	8.00– 9.00	9.00–10.00	
L	Paisley	5.00–	6.50–	7.00–	
J	Pickwick	5.00– 7.00	6.00– 9.00	6.00– 9.00	
L	Plaza	7.50–11.50	9.50–13.50	10.00–14.50	18.00–20.00
L	St. Francis	12.00–22.00	13.00–20.00	16.00–25.00	30.00–55.00
B	Senate	5.00– 6.00	6.00– 7.50	7.50– 9.00	
N	Sheraton Palace	8.75–16.50	13.85–20.50	13.85–20.50	25.00–150.00
L	Sir Francis Drake	11.00–16.00	13.00–17.00	16.00–22.00	35.00–50.00
L	Stewart	7.00–12.00	9.00–14.00	11.00–18.00	26.00–30.00
N	Sutter	5.00– 7.00	7.60– 9.00	8.00–10.00	
C	Whitcomb	10.00–12.00	11.00–16.00	12.00–16.00	25.00–60.00
H	Worth	7.00–	8.00–	9.00–	

SAN FRANCISCO ANNUAL MEETING, OCTOBER 31-NOVEMBER 4

A Housing Bureau will be operated by the San Francisco Convention and Visitors Bureau for the Association. Since all requests for rooms are handled in **chronological order,** it is recommended that you send in your application as quickly as possible.

In making hotel reservations please use the blank below, indicating your first, second, and third choice of hotels listed. Because of the limited number of **Single Rooms Available,** you will have a better choice of securing accommodations in the hotel you prefer if your request calls for rooms to be occupied by two or more persons. Rates quoted are for the room, and in case of double occupancy, the rate will be shared.

No Minimum Rates, or any specific rate within the full price range quoted, can be guaranteed when your reservation is confirmed. Hotels make every effort to give you the requested rate. However, this is governed by prior check-outs and availability of such rooms on the date of your arrival.

All Requests Should Be Accompanied by a Deposit Check for $10 per room made out to the **APHA Housing Bureau.** Hotels cancel unclaimed reservations by 4:00 p.m. Therefore, a deposit is requested to insure that your reservations will be held on your arrival date—whatever the hour. Your deposit will be credited to your account. **Please Do Not Send Cash.**

Cancellations: Cancellations must be received 15 days prior to the meeting for refunds of your deposit to be made by the hotel.

Late Requests: Applications Received Later Than October 16 (15 days prior to the opening date of the convention) **will be returned.** In such cases please select your own hotels and write to them direct.

All reservations must clear through the Housing Bureau. All requests must give definite date and approximate hour of arrival and names and addresses of all persons who will occupy rooms requested.

ALL RESERVATIONS WILL BE CONFIRMED IF REQUEST IS RECEIVED NOT LATER THAN OCTOBER 16.

MAIL TO:

APHA HOUSING BUREAU
Room 300, 61 Grove Street
San Francisco 2, California

(*Note:* Single rooms are very scarce. Please arrange to share a twin-bedroom with another.)

PLEASE MAKE RESERVATIONS NOTED BELOW:

First Choice Hotel .....

Second Choice Hotel .....

Third Choice Hotel .....

Single Room .....

Double Bedroom .....

Twin Bedroom .....

Parlor, Bedroom Suite .....

Arrival ..... at ..... A.M. ..... P.M. Departure .....

NAMES OF ALL OCCUPANTS:
(Please bracket those sharing a room)

ADDRESSES:

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Check For $..... payable to **APHA Housing Bureau** is enclosed. Please enclose a self-addressed stamped envelope.

MAIL CONFIRMATION TO: (Signed) .....
(Please print or type)

Address .....

City ..... Zone ..... State .....

NEWS OF AFFILIATED SOCIETIES AND BRANCHES

APHA Affiliated Societies and Branches

SOCIETY AND SECRETARY

ALABAMA PUBLIC HEALTH ASSOCIATION, Ralph Roberts, State Health Dept., Montgomery
ARIZONA PUBLIC HEALTH ASSOCIATION, J. Rex James, Maricopa County Health Dept., Phoenix
ARKANSAS PUBLIC HEALTH ASSOCIATION, Mrs. Vada Russell, State Health Dept. Bldg., Little Rock
CALIFORNIA, NORTHERN, PUBLIC HEALTH ASSOCIATION, Mrs. Joan Davis, City Health Dept., San Jose
CALIFORNIA, SOUTHERN, PUBLIC HEALTH ASSOCIATION, Dorothea Hansen, City Health Dept., Los Angeles 12
COLORADO PUBLIC HEALTH ASSOCIATION, Alice de Bruyn Kops, 4660 S. Delaware, Englewood
CONNECTICUT PUBLIC HEALTH ASSOCIATION, Shirley Thayer, R.N., 61 Arnold Way, West Hartford 7
CUBAN PUBLIC HEALTH SOCIETY, Dr. Raphael Calvo Fonseca, Calle 19 No. 511 Altos Vedado, Havana
FLORIDA PUBLIC HEALTH ASSOCIATION, Everett H. Williams, Jr., P. O. Box 210, Jacksonville
GEORGIA PUBLIC HEALTH ASSOCIATION, Carl Fox, 33 Pryor St., N.E., Atlanta
HAWAII PUBLIC HEALTH ASSOCIATION, Alison MacBride, R.N., 510 S. Beretania St., Honolulu 13
IDAHO PUBLIC HEALTH ASSOCIATION, Charles Hammond, P. O. Box 640, Boise
ILLINOIS PUBLIC HEALTH ASSOCIATION, William J. Hixon, Evanston Health Dept., Evanston
INDIANA PUBLIC HEALTH ASSOCIATION, Malcolm J. McLelland, State Board of Health, Indianapolis
IOWA PUBLIC HEALTH ASSOCIATION, Lloyd Coe, Iowa Hospital Association, 1012 Liberty Bldg., Des Moines
KANSAS PUBLIC HEALTH ASSOCIATION, W. W. Wilmore, Kansas Tuberculosis and Health Assn., 1134 Topeka Ave., Topeka
KENTUCKY PUBLIC HEALTH ASSOCIATION, Peggy Fisher, 620 S. Third St., Louisville 2
LOUISIANA PUBLIC HEALTH ASSOCIATION, Lucille Godefler, State Dept. of Health, New Orleans 7
MARYLAND PUBLIC HEALTH ASSOCIATION, Mary Thompson, Prince Georges County Board of Education, Upper Marlboro
MASSACHUSETTS PUBLIC HEALTH ASSOCIATION, Mrs. Elizabeth K. Caso, Dept. of Health, Cambridge
MICHIGAN PUBLIC HEALTH ASSOCIATION, Marjorie Delevan, 1817 West St. Joseph Street, Lansing
MINNESOTA PUBLIC HEALTH ASSOCIATION, D. S. Fleming, M.D., State Dept. of Health, University Campus, Minneapolis
MISSISSIPPI PUBLIC HEALTH ASSOCIATION, H. E. Boone, P. O. Box 1700, Jackson
MISSOURI PUBLIC HEALTH ASSOCIATION, Mrs. Nadia Craver, 5th Fl., State Office Bldg., Jefferson City
MONTANA PUBLIC HEALTH ASSOCIATION, Thomas S. Willett, Montana Public Health District 1, Hardin
NEBRASKA PUBLIC HEALTH ASSOCIATION, George R. Underwood, M.D., 935 R. St., Lincoln, Neb.
NEW JERSEY PUBLIC HEALTH ASSOCIATION, Waldo McNutt, M.P.H., Delaware River Drive, Frenchtown
NEW MEXICO PUBLIC HEALTH ASSOCIATION, Daniel T. Marley, P. O. Box 8066, Albuquerque
NEW YORK CITY, PUBLIC HEALTH ASSOCIATION OF, Frances Ann McVey, 4317 Robinson St., Flushing 55, N. Y.
NEW YORK STATE PUBLIC HEALTH ASSOCIATION, Mrs. Kathleen Boland, Rensselaer County Health Dept., Troy
NORTH CAROLINA PUBLIC HEALTH ASSOCIATION, Robert W. Brown, Box 7525, Asheville
NORTH DAKOTA PUBLIC HEALTH ASSOCIATION, Alice H. Peterson, M.D., State Dept. of Health, Bismarck
OHIO PUBLIC HEALTH ASSOCIATION, Mrs. June O'Donnell, 3516 Braddock St., Dayton
OKLAHOMA PUBLIC HEALTH ASSOCIATION, Marjorie Butler, 3400 North Eastern, Oklahoma City
OREGON PUBLIC HEALTH ASSOCIATION, Muriel David, City Bureau of Health, 203 N.E. 28th Ave., Portland
PENNSYLVANIA PUBLIC HEALTH ASSOCIATION, Emma J. Petach, R.N., 324 N. Second St., Harrisburg
PUERTO RICO PUBLIC HEALTH ASSOCIATION, Mrs. Mae de Acin, Apartado 211, San Juan 2
SOUTH CAROLINA PUBLIC HEALTH ASSOCIATION, Mrs. Laura M. DeMarse, State Health Dept., Columbia
SOUTH DAKOTA PUBLIC HEALTH ASSOCIATION, Alice Brady, R.N., State Dept. of Health, Pierre
TENNESSEE PUBLIC HEALTH ASSOCIATION, C. B. Tucker, M.D., State Dept. of Health, 420 Sixth Ave., N., Nashville
TEXAS PUBLIC HEALTH ASSOCIATION, Joseph N. Murphy, Jr., State Dept. of Health, Austin
UTAH PUBLIC HEALTH ASSOCIATION, Katherine Brandon, M.D., P. O. Box 25, Foothill Station, Salt Lake City
VIRGINIA PUBLIC HEALTH ASSOCIATION, Mrs. Helen W. Wiesmann, 1220 E. Broad St., Richmond
WASHINGTON STATE PUBLIC HEALTH ASSOCIATION, Caesar Branchini, General Electric Company, Richland
WEST VIRGINIA PUBLIC HEALTH ASSOCIATION, Mrs. Katherine L. Brown, West Virginia State Dept. of Health, Charleston 5
WISCONSIN ASSOCIATION FOR PUBLIC HEALTH, Paul Weis, 1 W. Wilson St., Madison
MIDDLE STATES BRANCH, APHA, Thelma Luther, Dept. of Health, Des Moines, Iowa
SOUTHERN BRANCH, APHA, Guy Tate, Jr., Jefferson County Health Dept., Birmingham, Ala.
WESTERN BRANCH, APHA, Robert G. Beaumier, 1309 Smith Tower, Seattle, Wash.

Washington Puts Members to Work

"Cultural Factors Influencing Health Behavior" was a major address and theme at the 24th annual conference of the Washington State Public Health Association (November 1-3, Port Angeles). Edward Wellin, Ph.D., APHA behavioral sciences project director, sharing the platform with Barkev Sanders, Ph.D., PHS research consultant, helped conference participants shape their thinking for the balance of the program with this opening statement: "As a rule, health services or programs are seldom evaluated solely on their health values, but rather on how they fit with the mores of the community and what they do to the community." Building on such ideas, the conference sounded a call for action on several public health fronts especially in local health departments.

The 250 members attending approved

an unprecedented 18 resolutions, many of which involved the setting up of special study or action committees. For example, the association:

—called for a unified inspection of milk suppliers' premises, under supervision of the local full-time health department. Milk inspection in some communities are now being made by inspectors from more than one city which "bewilders the producer, results in divided responsibility and uneven supervision."

—approved establishment of a committee to study and define the role and contribution of state and local health departments in the field of mental health. The committee is to report its findings within four months so that they may be used in the governor's Conference on Community Mental Health.

—asked for a study of local water districts in Washington to determine whether the legislature shall be requested to provide the districts with some overall daily sanitary engineering and public health supervision.

—established a committee to study public and private housing with a view to a minimum-standard housing code for Washington and, also, to help prepare legislation that would transfer hotel-inspection from the Department of Labor and Industry to the State Health Department.

—recommended that all visiting nurses and public health nurses have continuing medical supervision and an established relationship with a full-time public health agency. This supervision is not being provided in many communities.

—voted to continue the committee established last year to up-date the Emerson report as it pertains to Washington.

The first Award of Honor presented by the association was conferred upon Cedric Northrop, M.D., head of the state tuberculosis control program for 18 years who recently became TB officer for Seattle-King County. The honor is based upon outstanding contributions to public health field.

Officers elected for 1960 are:

President—Vernon Michael, M.D., M.P.H., health officer, Benton-Franklin County Health Department, (succeeding Seymour Standish, Jr.)

President-Elect — Tom Drummey, supervisor, Special Health Services, State Health Department

Vice-President — Donald R. Peterson, M.D., director, Adult Hygiene, Seattle-King County Health Department

Secretary—Caesar Branchini, executive assistant, Benton-Franklin County Health Department

Treasurer—Robert Gilkey, chief bacteriologist, Tacoma-Pierce County Health Department (re-elected).

Conference rapporteur was Don Luke, chairman of public relations, WSPHA and editor, "Washington's Health."

In New Jersey It's EVE

During 1959 the New Jersey State Department of Health confirmed 33 cases of eastern viral encephalitis (EVE), resulting in 21 deaths. EVE was the topic of the first scientific meeting of the newly organized New Jersey Public Health Association, held on January 13 in Princeton. The purpose of the conference was to review experiences in control measures and outline protective action being taken to prevent a possible recurrence this year. EVE is prevalent in many warm-blooded animals and birds; the State Health Department chose the name to distinguish it readily from eastern equine encephalitis.

In an opening address, Governor Meyner paid high tribute to all who had helped to keep the EVE occurrence from becoming a major hazard. He pointed out, however, that the annual death toll from such causes as tuberculosis, cancer, and accidents regularly far exceeds that of the past year from EVE, and called for reason in assessing those activities that warranted public health emphasis.

His address was followed by papers from those who had had actual experience in the outbreak: a public health nurse, local health officer, practicing physician, public health laboratory director, pathologist, county mosquito control worker, and a public health veterinarian. Commissioners of four state departments either participated in the program or were present. Roy M. Feemster, M.D., director, Division of Communicable Diseases, Massachusetts Department of Health, presented a review paper on "Two Decades of Experience with Eastern Equine Encephalitis"; Roscoe P. Kandle, M.D., New Jersey's state health officer, summarized the meeting in "The Road Ahead" for the more than 350 people present.

A series of timely scientific meetings, of which this was the first, is an objective of the newly formed NJPHA. The second of the series is scheduled for March 23, when Secretary of Health, Education, and Welfare Arthur S. Flemming will address a joint dinner meeting in Trenton of the New Jersey Health Officers' Association and the NJPHA on "Food Additives."

Michigan Starts Newsletter

Michigan Public Health Association issued its first newsletter in October, 1959. The MPHA Publicity Committee made up of division secretaries under the chairmanship of Gladys Rydeen, health educator, Michigan Department of Health, has the editorial responsibility. The first issue was eight pages; four were a directory of officers and committees and two given over to MPHA division activities.

Among news items in Volume 1, No. 1: Marjorie Delavan, retired chief of the Education Section, Michigan Department of Health, began her official duties as executive secretary of MPHA in September.

MPHA's 39th Annual Public Health Conference will be held in Detroit, May 11-13. Philip V. Shirley, sanitarian, Ingham County Health Department, is president.

Mississippi Promotes Home Safety

The Mississippi Public Health Association met December 2-4, at Jackson with a record attendance of 620 registrants. During a brief speech at the opening general session Governor-elect, Ross R. Barnett, pledged his cooperation in promoting Mississippi's health. In the response, A. L. Gray, M.D., state health officer, cited mental illness and retardation and an aging population as paramount problems facing health officials in the state.

Paul V. Joliet, M.D., chief of the PHS Accident Prevention Program addressed the conference on the prevention of home accidents which, he noted, claim greater tolls in the nation than do highway accidents. He called for more and better programs in health departments: "The home accident rate would decrease if we attacked the problem." Following his talk the State Board of Health and the Mississippi Safety Council bestowed their first joint certificate of merit on Bolivar County for its organized attack on the problem. The award is for the "best balanced home accident prevention program" carried on among the state's 82 county health departments. Dominic Tumminello, M.D., Bolivar County health officer, received it.

The session ended with the presentation of awards to five workers who had completed 25 years of public health service in Mississippi during 1959: Irvin B. Trapp, M.D., health officer, Claiborne County; Sarah E. Thornton, R.N., supervising nurse, Lauderdale County Health Department; Evelyn R. Raney, R.N., Winston County Health Department; A. L. Gray, M.D., executive officer, Mississippi State Board of Health; Adelle D. Savely, R.N., Alcorn

County Health Department; and Cyrus T. Roberts, district advisory sanitarian, Tupelo. MPHA also announced the establishment of an award honoring the late state health officer, Felix J. Underwood, M.D. It will be presented annually to "the person in the state who has done most for the health of the people of Mississippi."

Ralph B. Hogan, M.D., chief, Laboratory Branch, PHS Communicable Disease Center, addressed the second general session on "General Infectious Diseases," and met later with the laboratory section to discuss the present status of laboratory diagnosis of virus diseases. More than 50 program participants, three of them from out of state, were engaged in the sessions of the eight MPHA sections during the second and third days of the meeting. Five of the sections met twice. Topics for sectional meetings included: role of the health department in continued care program for psychiatric patients, "a restaurant man's view on the importance of sanitation," current trends in venereal disease control, and a preview of the White House Conference on the Aging.

Officers for 1960 are:

President—Z. E. Oswalt, Mississippi State Board of Health, Jackson
President-Elect—Grace Huffman, Pike County Health Department, McComb
Vice-President—W. R. May, M.D., director, Lincoln County Health Department, Brookhaven (outgoing president)
Treasurer—T. W. Williamson, Mississippi State Board of Health, Jackson
Secretary—H. E. Boone, Mississippi State Board of Health, Jackson.

Tennessee: Aging, Safety Keynoted

A day of work for six special advisory committees preceded the fall meeting of the Tennessee Public Health Association and the Conference of Tennessee Public Health Workers in Knoxville; 462 persons registered for the three-day meeting, a record for the TPHA. Those at the general session on September 30 heard a message from Governor Buford Ellington, and an address by R. H. Hutcheson, M.D., Tennessee's commissioner of public health. Public relations in a community hospital, board of education and health department relations, polio and other viruses, and Nashville's air pollution study were the other topics for this session. Each of the seven TPHA sections held all-day meetings on October 1. A general session on October 2 was devoted to reports from the sections, the president's message, and the executive meeting at which awards were presented.

The governor's message described the state's program for solving the problems of an aging population. A legislative study group will report its findings at a state-wide conference on aging in the fall of 1960. The State Division of Finance and Administration has been directed to organize Tennessee's program for the 1961 White House Conference. "Our objective should be to develop a program that will further extend the life span of the human being but at the same time be designed so that a person in this segment of the population can enjoy living. . . ."

Dr. Hutcheson asked public health workers to emphasize accident prevention in their programs. "Exposure to accidents in this mechanized jungle in which we live is inevitable," but steps can be taken to reduce accidents, especially in the home. A survey of 2,753 homes in 20 counties had revealed that one-third of them had numerous safety hazards. The commissioner also stressed the importance of poison control centers, driver training, and recreational safety.

Subjects for the sectional meetings included: tuberculin testing, indigent medical care, interpersonal relations for the nurse, school health, housing, school cafeteria sanitation, fluorescent antibody laboratory technics, the Tennessee dental caries study, the clerk and public relations, rabies, electronic data processing,

a manual for teachers on health department services, and motivation in health education from viewpoint of behavioral sciences.

There were 49 program participants in these sessions including several out of state speakers and representatives of the PHS. Irwin M. Rosenstock, Ph.D., chief, Behavioral Studies Section, PHS, Washington, D. C., challenged the Health Education Section to learn more about why people act as they do from a health standpoint. State rabies control director, L. E. Frederickson, D.V.M., reported that only two rabies deaths had occurred since the state-wide vaccination program had begun in 1954; compare to 1947 when 27 per cent of all United States rabies deaths were in Tennessee.

The Tennessee Association of Sanitarians' Outstanding Service Award went to D. L. Yates, Humphreys County, Waverly. Thirty-year service certificates were presented to: Gussie Sheets, clerk, Monroe County, Madisonville; E. F. Harrison, M.D., Tennessee Tuberculosis Hospital, Chattanooga; and Thomas B. Link, sanitarian, Washington County, Jonesboro.

Officers of the Association for 1960 are:

President—R. B. Turnbull, M.D., director, Tuberculosis Field Service, West Tennessee Tuberculosis Hospital, Memphis

President-Elect—Frank Cheney, sanitation consultant, Tennessee Department of Public Health, Nashville

Vice-President—Mildred Patterson, health education coordinator, Knox County Health Department, Knoxville (outgoing president)

Secretary-Treasurer—C. B. Tucker, M.D., director, Division of Preventable Diseases, Tennessee Department of Public Health, Nashville.

APHA membership application blank on page XXXV

Social Welfare Assembly Meets

At the 15th annual meeting of the National Social Welfare Assembly in New York, December 8-9, Stanley C. Allyn, board chairman of the National Cash Register Company, was elected president. He succeeds Hugh R. Jackson, who is president of the Better Business Bureau of metropolitan New York.

In the framework of the general theme, "Joining Forces to Combat Community Problems," the main emphasis was on such problems and their interrelation as housing, juvenile delinquency, and city deterioration.

EMPLOYMENT SERVICE

The following pages present information for those seeking public health personnel and for those seeking positions in public health. Other information concerning vacancies and personnel available is on file in the Association office. Anyone wishing to have the benefit of this additional information can obtain it by writing to the Vocational Counseling and Placement Service of the Association.

Advertising space in these pages is available at special rates for the use of employers or individuals. The charges are $5 for the first 50 words or fraction thereof and $1 for each additional 10 words or fraction thereof. There is no charge to members or Fellows of the Association who desire to utilize the **Positions Wanted** portion of these pages. **Closing date** for receipt of advertisements is the first of the month preceding the desired month of publication. **All correspondence should be sent to the American Public Health Association, 1790 Broadway, New York 19, N. Y.**

POSITIONS AVAILABLE

Medical Officer—$1,048-$1,306 per month. To direct infectious disease unit of large county health department. Requires California medical license, experience in infectious diseases, and M.P.H. degree or certification in pediatrics, preventive or internal medicine. Write Orange County Personnel Department, 801-C North Broadway, Santa Ana, Calif.

Psychiatrists—(1) Chief, Alcoholic Rehabilitation Division; (2) Chief, Legal Psychiatric Services Division. This clinic serves the law-enforcement agencies of the District of Columbia; (3) Chief, Adult Mental Health Division. Salary $12,555. Federal government retirement, insurance, and leave privileges. Write Director of Public Health, D. C. Department of Public Health, 300 Indiana Ave., N.W., Washington 1, D. C., Attn.: Chief, Bureau of Mental Health.

Medical Health Officer—with M.P.H. and eligibility for licensure in Illinois. New bi-county health department to begin operations July 1, 1960. In the heart of the recreation area of southern Illinois; population approximately 100,000. Beginning salary $15,000, plus travel. Opportunity to develop department and program. Southern Illinois University in adjacent county. Write Louis Helleny, Secretary, Board of Health, Herrin, Ill.

Local Health Officer—Hammond, Ind., population 108,000. Well established local health department. Salary $16,000. Prefer person with M.P.H. but will consider someone with public health experience. Valid license to practice medicine in the state of Indiana. Apply to Dr. F. F. Premuda, Hammond Health Department, City Hall, Hammond, Ind.

Public Health Physician—in New Mexico Department of Public Health. Salary range $9,000-$12,600. Fringe benefits. Excellent opportunity for young man. Contact Merit System Council, 122 Capitol Pl., Santa Fe, N. M.

Physiatrist—Opening for Board certified or eligible specialist in physical medicine for director of community rehabilitation center. Fine growth possibilities. Salary open, commensurate with experience and training. Send complete details, including salary request, to Robert A. Silvanik, Rehabilitation Center, 326 Locust St., Akron 2, Ohio.

Public Health Dentist—Outstanding opportunity to become associated with one of the nation's leading public health dental programs. The Philadelphia Department of Public Health is now accepting applications for the position of Public Health Dentist I. Duties include assisting the director of the Division of Dental Health in the development, planning, and administration of a city-wide dental health program emphasizing the care and treatment of children's teeth. Salary $9,674-$10,596. Requirements: Graduation from an accredited school of dentistry, including completion of courses in pedodontia, and an M.P.H. and two years' experience in dentistry, one year of which shall have included experience in a supervised public health dental program. Additional information and an application form may be obtained by contacting David A. Soricelli, D.D.S., Director, Division of Dental Health, Philadelphia Department of Public Health, 527 City Hall Annex, Philadelphia 7, Pa.

Public Health Physician (District Health Officer)—Various locations available in Wisconsin. Act as medical public health administrator of district area; district epidemiologist; plan, organize, supervise work of professional staff consisting of engineers, nurses, sanitarians, nutritionist, dental hygienist, health educators, and social workers. M.P.H. degree, public health experience, and eligibility for license to practice medicine in Wisconsin required. Salary $12,156-$14,976, plus travel allowance. Civil service, vacation, sick leave, Social Security, retirement, group health and life insurance benefits. Write Dr. E. H. Jorris, Assistant State Health Officer, 400 State Office Bldg., Madison 2, Wis.

Director, Local Health Services—Wisconsin. Work with the state health officer and professional staff in improvement of local

health services. M.P.H. degree and eligibility for license to practice medicine in Wisconsin required. Salary $1,013-$1,248, commensurate with experience. Write E. H. Jorris, M.D., Assistant State Health Officer, 400 State Office Bldg., Madison 2, Wis.

Director, Bureau of Maternal and Child Health—Plans and directs a state-wide program for the conservation and improvement of maternal and child health; coordinates and supervises the activities of the bureau. Major activities include the child guidance, school health, and nutrition programs. Desirable qualifications and experience: M.P.H., one year's experience in private practice, five years' experience in public health work, three years of which shall have been in an administrative capacity. Pediatric training desirable. Eligibility for license to practice medicine in Wisconsin required. Salary starts at $1,123 per month, with annual merit increases of $40 to $1,298. Civil service, vacation, sick leave, Social Security, retirement benefits. Group life, hospital, and sickness insurance costs shared by the state. Write E. H. Jorris, M.D., Assistant State Health Officer, 1 West Wilson St., Madison 2, Wis.

Public Health Nurse—Generalized. Salary $384-$466; mileage. Retirement plan, other benefits. High, dry climate, four seasons; center of northern Arizona recreation area. Merit system. Write Merle E. Smith, M.D., M.P.H., Director, Coconino County Health Department, Flagstaff, Ariz.

Supervising Public Health Nurse—$483-$587. In desert area, start at $532. Graduation from nursing school, two years' study in public health nursing, some training in theory and practice of supervision, two years' experience, and California registration required. Paid vacation and sick leave, part-paid health insurance, Social Security and retirement plan, other benefits. County Personnel, Courthouse, San Bernardino, Calif.

Public Health Nurse—Immediate position in health department. Merced County is situated in the growing San Joaquin Valley, near mountain resorts, and 2½-hour drive to San Francisco. Five-day week, paid sick leave, vacation, county-paid medical and health insurance, retirement and Social Security; moderately priced housing available; county car furnished. Salary $4,740-$5,772. Write to A. Frank Brewer, M.D., Merced County Health Department, P. O. Box 1350, Merced, Calif.

Public Health Nurse—$417-$507. In desert area, start at $460. Must be eligible for California registration. Paid vacation and sick leave, part-paid health insurance, Social Security and retirement plan, other benefits. County Personnel, Courthouse, San Bernardino, Calif.

Sanitarian-Hospital—Charge of infections in entire hospital to promote highest quality of cleanliness. Supervision of custodial operations. Degree in sanitary engineering or sanitary service with minimum of five years' experience in broad field of environmental sanitation. Some supervisory experience in hospital desired. Salary open. Apply Personnel, Hackensack Hospital, Hackensack, N. J.

P.H.N. Director — for newly-formed combined nursing service. Serves suburban county of 325,000 in Chicago metropolitan area. Nursing staff of 30. Qualified health officer. Liberal personnel policies, including vacation, sick leave, Social Security, and retirement. Salary dependent on qualifications. Master's degree desirable; supervisory and administrative experience required. Write Charles A. Lang, M.D., Director, DuPage County Health Department, 209 E. Liberty Dr., Wheaton, Ill.

Public Health Nurses — Staff positions with combination Health Department and Community Nursing Service. Suburban county adjoining Chicago metropolitan area. Generalized nursing services, including school and bedside care. Desire nurses with public health nursing preparation and experience. Starting salary $4,800, plus $900 travel allowance. Contact Charles A. Lang, M.D., Director, DuPage County Health Department, 209 E. Liberty Dr., Wheaton, Ill.

Public Health Nurses or Registered Nurses — interested in a generalized public health nursing program in rural-urban areas under a six-county district health department. Forty-hour week, Social Security, 15 working days' paid vacation and equivalent in paid sick leave per year, Workmen's Compensation, and health insurance benefits. Generous car allowance. Expense allowance when outside own working area. Salary range $3,900-$4,800 based on qualifications and experience, with merit increases. Write Director, Northeast Colorado Health Department, 700 Columbine, Sterling, Colo.

Executive Director — Combined public health nursing agency. Education and experience in public health nursing, including supervisory experience. Have well qualified health officer. Salary open. Five-day, 40-hour week, month's vacation, and liberal personnel policies. Capital city, population 216,000. Public Health Nursing Association, Des Moines, Iowa. Write Mrs. J. R. McNerney, Personnel Committee, 521 16th St., West Des Moines, Iowa.

Public Health Nurse I — $5,057-$5,537. Challenging position in generalized public health nursing with progressive suburban department 17 miles west of downtown Detroit. Many liberal fringe benefits. Apply, Amalia Krause, Nursing Director, Wayne County Health Department, Eloise, Mich.

Junior Public Health Nurse — Salary range $4,160-$4,979. Liberal retirement and sick leave benefits. New modern building. Promotional opportunities. Apply, Flint Civil Service Commission, City Hall, Flint 2, Mich.

Public Health Nurses—Salaries $335-$455. For generalized public health nursing in New Mexico Department of Public Health. Opportunities for advancement, retirement plan, and other fringe benefits. Write Merit System Supervisor, 122 Capitol Pl., Santa Fe, N. M.

Public Health Nursing Supervisor—with voluntary agency doing bedside nursing program. Staff of 26 nurses. Forty-hour week, 21 days' vacation, six holidays, sick leave, retirement, and Social Security. Salary $6,000; car allowance $480. Apply Director, Visiting Nurse Association, 2616 S. Calumet Dr., Houston 4, Tex.

Public Health Nursing Consultant (Assistant to Director of Public Health Nursing in State Health Department)—Give consultation to public health personnel in all phases of public health nursing, including in-service education; prepare manuals, guides, etc., for public health nurses; assist in administration of program. Bachelor's degree in public health nursing minimum preparation; master's degree desirable; four years' experience in public health nursing, including two in administration or supervision. Salary: start at $6,756, maximum $8,076. Civil service, vacation, sick leave, Social Security, and retirement benefits. Write Miss Ione M. Rowley, R.N., Director, Public Health Nursing, 119 Monona Ave., Madison 3, Wis.

Public Health Nurse III (District Advisory Nurse)—Give guidance and counseling to all public health nurses in a multiple-county area regarding community organization and relationships, program planning, public health nursing technics, records, and reporting. Responsible for inservice education program for local public health nurses and evaluation of nursing services. Salary range $5,676-$6,756, plus travel allowance. B.S. degree with major in public health nursing and three years' generalized experience as a public health nurse. Special requirement: registration or eligibility therefor as a registered nurse in Wisconsin; certification or eligibility for certification as a public health nurse in Wisconsin. Write R. J. Siesen, Personnel Officer, State Board of Health, Madison 2, Wis.

Sanitary Engineer—$541. College degree plus one year's experience in the field. In expanding health department in growing Phoenix, Arizona Merit System, 11 North 17th Ave., Phoenix, Ariz.

Public Works or Sanitary Engineer—Experienced in the development of public water supplies from ground-water resources, with experience preferably in arid regions, to assist and advise the Government of Sudan in the development of a program of ground-water resources to be used for agricultural and public water supply purposes. Address **Box WS-2,** Office of Public Health, International Cooperation Administration, Washington 25, D. C.

Sanitarian—This unusual position offers a sanitarian with training and initiative an excellent opportunity to implement his own program under a nonpolitical Village government in this fast-growing residential community of 30,000. Liberal vacation and retirement benefits. Salary range $6,000-$7,440. Send for application form to John L. Scott, Village Manager, Village Hall, Park Forest, Ill.

Sanitarians—Higher salaries are being offered to qualified sanitarians by the Public Health Services, Philadelphia Department of Public Health. New employees will start at $5,348. Liberal fringe benefits. For information call Mr. Mullin at LO 7-0290, or write Room 504, City Hall Annex, Philadelphia 7, Pa.

Virologist—Vacancy with the Hawaii Public Health Laboratory. Requires two years of laboratory work experience involving the propagation, detection, and identification of viruses, and a Ph.D. degree in virology, bacteriology or related field. Appointments to this position may be made at any step between $7,860-$10,536 per annum. Write for further information and application to the Department of Personnel Services, State of Hawaii, 825 Mililani St., Honolulu 13, Hawaii.

WANTED

Public Health Engineer II—Qualifications: Master's degree with at least two years' experience in a state or local health department. Duties: Direction of activities of the Sanitation Division, one of three major divisions of the Bureau of Environmental Sanitation, supervision of 36 employees. Salary range $7,819-$8,473. Additional $25 monthly for engineer registered in Wisconsin.

Nutritionist—to organize and execute nutrition program for Milwaukee City Health Department. Qualifications: Master's degree in nutrition and three years' experience in a public or voluntary health agency. Salary range $6,121-$6,396.

Civil service position. Vacation, sick leave, medical and hospital insurance, and liberal pension plan. Write to E. R. Krumbiegel, M.D., Commissioner of Health, 841 N. Broadway, Milwaukee 2, Wis.

Associate Laboratory Director — in charge of County Public Health Laboratory under part-time pathologist. Minimum training: Ph.D. or Dr.P.H. in microbiology and knowledge of work in public health laboratory. Minimum experience: two years' satisfactory experience in public health laboratory work or equivalent. Salary $8,820-$10,296. Apply Cattaraugus County Health Department, **Box 573,** Olean, N. Y.

Bacteriologist — Two vacancies: one for Bacteriologist-in-Charge, Northwest Branch Laboratory located at Bowling Green State University, Bowling Green; the other for Parasitologist-Bacteriologist, Central Laboratory. Salary $460-$550 monthly. College degree plus experience required. Apply to Chief, Division of Laboratories, Ohio Department of Health, Columbus 10, Ohio.

Dental Health Educator—to work on dental education program and examinations in city schools. Salary dependent upon experience and qualifications. Vacation, sick leave, Social Security, and retirement benefits. Apply La Crosse City Health Department, City Hall, La Crosse, Wis.

Public Health Educator III—Initiate and develop school-community health education programs in a multicounty district. Desirable qualifications: M.P.H. degree, plus two years' experience in health education; sound working knowledge of principles of education and methods of teaching. Salary $503-$598 per month. Travel allowance, vacation, sick leave, retirement, group insurance plans. Write Dr. Amy L. Hunter, Director, Bureau of Maternal and Child Health, Wisconsin State Board of Health, Madison 2, Wis.

Public Health Educator III (Dental Hygienist) — Assist in developing dental health programs for preschool and adult groups in a several county area. Coordinate dental health education activities with overall health education program. College graduation, a year of graduate training in an accredited school of public health, and two years' experience. Licensure or eligibility for licensure to practice dental hygiene in Wisconsin essential. Salary starts at $6,036; maximum $7,176. Civil service, vacation, sick leave, Social Security, and retirement benefits. Write R. J. Siesen, Personnel Officer, State Board of Health, 400 State Office Bldg., Madison 2, Wis.

Dental Hygienists—Must have M.P.H. degree and preferably some public health work experience. Salary $460-$575. Civil service; Social Security and state retirement coverage. Write Mr. Alfred T. Johnson, Personnel Director, Oregon State Board of Health, P. O. Box 231, Portland 7, Ore.

Medical Social Work Consultant—$483-$587. Completion of two-year postgraduate social work course and either one year's experience in hospital, clinic, or health department or two years' medical or psychiatric social work experience. Paid vacation and sick leave, part-paid health insurance, Social Security and retirement plan, other benefits. County Personnel, Courthouse, San Bernardino, Calif.

Medical or Psychiatric Social Workers —Three current openings in the Children's Hospital, Columbus, Ohio. A new wing to be opened in the spring will extend the bed capacity to 400 and with it the social service program. Strong points already included in the program are a large outpatient department, team-approach orientation, good social service acceptance, and diversified services. Graduation from an accredited school of social work required. Contact the Personnel Department, Children's Hospital, Columbus 5, Ohio.

Public Health Social Worker — needed for three-year project in family case-work. Local health department in California for county of 60,000 population adjacent to state capital. Master's degree in social work and own car required. Salary $455 per month for first year, $478 for second, $502 for third. For detailed information please write to Herbert Bauer, M.D., Public Health Director, Yolo County Health Department, P. O. **Box 532,** Woodland, Calif.

Social Work Administrator—State Board of Health, Child Guidance Division, Madison 2, Wis., Amy L. Hunter, M.D. Creative pioneering opportunity for mature, experienced social worker. Plan and integrate social work facets of public health program for prevention of emotional health problems; team approach in organization and coordination of various state-wide educational and consultation projects, including inservice training of state and local public health personnel and other professionals; education of lay groups; emphasis on discussion process to increase understanding and enhance constructive attitudes supportive of primary prevention; supervise several social workers serving on a district level in the above program. Headquarters: Madison. Requirements: M.S.W.; minimum of five years' relevant experience, mainly in community child guidance clinic team, including two years as a social work supervisor. Salary $7,356-$8,736.

Local Health Director — Charlotte and Mecklenburg County, N. C.; population 275,000. Staff of 160; outstanding new headquarters. Health-oriented community. Board certification required. Salary range $12,600-$16,380, plus travel. Reply to Dr. Howard P. Steiger, 207 Hawthorne Lane, Charlotte 4, N. C.

Public Health Statistician—Opening for Chief Statistician to direct statistical work in Health Division of the city of St. Louis. Master's degree in biostatistics or equivalent required. Sick leave, 11 paid holidays, three weeks' vacation. Write for further details. Department of Personnel, 235 Municipal Courts Bldg., St. Louis 3, Mo.

POSITIONS WANTED

On Box Numbers, Address APHA at 1790 Broadway, New York 19, N. Y.

Internist-Administrator—M.P.H.; Board eligible, internal medicine; woman. Experienced as Bureau of Labor Statistics economist, clinician, medical care researcher. Desires combination of clinical medicine and administration in union health center, preferably New York metropolitan area. **Box PH-2,** Employment Service, APHA.

Tuberculosis or Internal Medicine—Age 52, citizen. Twenty years as clinical director and administrator of recognized tuberculosis hospitals. Experienced in public health (tuberculosis) and direction of medical student, intern, resident, and affiliating student nurse programs. Basically a specialist in chest diseases, but fully qualified in internal medicine. Equable winter climate preferred. Available now. **Box PH-99,** Employment Service, APHA.

Public Health Dentist—Experienced in private practice, U. S. Navy Dental Corps, hospitals, and public health. Have had training in pedodontia, analgesia, and orthodontics. M.P.H. this June. Seek state, large city, or county public health position. **Box D-23,** Employment Service, APHA.

Public Health Nurse—Interested in position overseas. Has over 12 years' overseas experience in administration, teaching. Multilingual, M.A., married, no dependents. **Box M-24,** Employment Service, APHA.

Bacteriologist—Ph.D., age 39. Public health oriented. Desire position as chief or assistant chief of public health laboratory, or affiliation with medical or public health school. Experienced teacher, researcher, and administrator. **Box L-71,** Employment Service, APHA.

Public Health Physician—Experienced in family and community health, program planning, teaching, clinical pediatrics, administration. B.A. (psychology), 1940; M.B., 1950; diploma (child health), 1952. Formerly associate professor, social and preventive medicine, South Africa, presently medical director, Health Operations, Tehran, for international welfare organization. Dr. Lewis, A.J.D.C., **Box 731,** Tehran, Iran.

Commercial Advertisements

All communications on the following commercial advertisements should be sent to Burneice Larson, Medical Bureau, Suite 605, 900 North Michigan Avenue, Chicago 11, Ill.

OPPORTUNITIES AVAILABLE

(a) Director of health services and medical director general hospital, beautiful West Coast location; (b) Director of health service, take charge county health department, Midwest; $12,000-$15,000; (c) Director, city health department; administration experience in public health required; South ocean shore resort of 265,000; (d) Epidemiologist, trained and experienced in field; West; $11,000-$14,000; (e) Chief of staff services, Industrial Hygiene Division; city health department; East; $11,000-$14,000; (f) Medical Biostatistician, university center; teach students; participate in research; East; good opportunity; (g) Bacteriologist to be in charge public health laboratory, Ohio, to $6,600; (h) Microbiologist, perform tests in public health laboratory; near San Francisco to $6,000; (i) Foreign assignment public health staff nurses, instructors; English speaking clientele, $5,000-$11,000; (j) Executive nurse, coordinate VNA and large city program; East, to $18,000; (k) Executive nurse director, VNA near Chicago; combined program; $8,000.

SITUATIONS WANTED

Medical Director, national health organization; 20 years' experience in development of health procedures, administration, research. Health Educator, nonmedical public health administration and medical care research; M.P.H., University of Michigan. Executive Nurse Director, M.Ed., B.S. public health, 5 years' experience, P.H. nursing association, city of 70,000.

BOOK REVIEWS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.

MENTAL DEFICIENCY—THE CHANGING OUTLOOK—Edited by Ann M. Clarke and A. D. B. Clarke. Glencoe, Ill.: Free Press, 1959. 513 pp. Price, $10.00.

This book is an interesting review of the field of mental deficiency by seven British authors. The format of the book is most satisfactory in that it is divided into three parts—Background, Theoretical Problems, and Practical Problems—with Conclusions at the end of each chapter. The American reader must accustom himself to somewhat different terminology and certainly to references to different laws and procedures, but this rather adds to the interest of the book.

The problems in studying the prevalence of the disability are frankly discussed and help to clarify some of the difficulties met by those planning programs in this field.

In the section on "Theoretical Problems" there is good coverage of the various approaches which have been made, with the need for further investigations repeatedly stressed. It would have been desirable to have more discussion of the changing bases upon which the various studies have been made. Studies in 1930 and 1950 are sometimes reported together without explanation of the difference in the basic assumptions.

The section of the book included in "Practical Problems" is excellent. The discussion of the content and the value of various tests is clear and comprehensive. The descriptions of the levels of expectation and the possible methods for teaching persons with different potentials of ability are both practical and practicable. The authors are always aware of the individual as a person. The scope of this section is indicated by the following quotations: "Generally speaking every feebleminded patient is socially and often emotionally maladjusted. The hospital's task is to initiate rehabilitation of the patient so that an early return to the community has a good chance of success." And later. "The vocational and social training is for many patients the only therapeutic help required—they are not in need of special psychotherapy nor do they care for educational help."

This book can be especially recommended to those wishing a useful summary of the history and recent developments in this important field.

MABEL ROSS

RADIATION HYGIENE HANDBOOK—Edited by Hanson Blatz. New York, N. Y.: McGraw-Hill (327 West 41st St.), 1959. 926 pp. 268 illus. Price, $27.50.

This handbook claims to be "a practical reference covering the industrial, medical, and research uses of radiation and atomic energy with special applications to the fields of health physics, industrial hygiene and sanitary engineering." Examination of the contents and testing for practicality leads to the conclusion that the claim is well justified.

The contributors form a distinguished group of scientists. Major sources of information are the National Bureau of Standards handbooks and other equally authoritative publications, particularly reports published by the United States Atomic Energy Commission. It is highly convenient to be able to find so much basic material between two covers. The section on control of radiation air pollution is outstanding.

Detectable defects are few and minor.

There are a number of instances of duplication, with the same material being given in more than one chapter. In one place the reader is referred to Section 15 when apparently it should have been Section 14. Unfortunately NBS Handbook 69 (June, 1959) was not available as a reference source at the time the manuscript was prepared. No mention is made of examination for cataract as part of the medical control program.

For those who can afford it, this handbook should find its place alongside the familiar handbooks of chemistry and physics as a useful standard reference work. LEONARD J. GOLDWATER

SEWAGE TREATMENT PLANT DESIGN—By a Joint Committee of the Federation of Sewage and Industrial Wastes Associations and the American Society of Civil Engineers. Washington, D. C.: Federation of Sewage and Industrial Wastes Associations (4435 Wisconsin Ave., N.W.), 1959. 375 pp. Price: nonmembers $7.00, members $3.50.

This practical manual summarizes current practices in the design of sewage treatment plants and offers guidance in processes, equipment, layout, and anticipated results of treatment. It contains the composite views of plant superintendents and consulting engineers but offers no approvals or disapprovals of various methods or mechanisms. Its value lies in the selected inclusion of processes which have been used in the sewage works field during the two decades, 1935-1955. The committees representing the two technical societies offer the warning that omission of any newer methods or treatment does not indicate that they are not effective; the manual subjects were chosen by the practicing engineers who constituted the committee.

Twenty-one chapters cover the basic processes of sewage treatment, with references to industrial wastes limited to their effect on process loading and design criteria. Each chapter provides interpretation of the purposes of the phase of treatment; and information on selection of types of units and auxiliary facilities, bases of design, experiences and results in actual plant installations, and references to technical literature.

In addition to coverage of treatment processes, the manual contains a thorough discussion of sewage characteristics and contributing populations and industries which affect design. Guidance is provided on general plant layout, design of pumping stations, and materials of construction. Safety provisions in design are stressed.

This book will be a valuable addition to the library of every designer and supervisor of sewage works facilities.

MORRIS M. COHN

ELEMENTARY DECISION THEORY—By Herman Chernoff and Lincoln E. Moses. New York, N. Y.: Wiley (440 Fourth Ave.), 1959. 364 pp. Price, $7.50.

Traditionally, statistics has been regarded as dealing with methods for the collection, analysis, and interpretation of data. Since World War II, some mathematical statisticians have examined statistical methodology from a different point of view, that of its contribution to the making of decisions involving elements of uncertainty. This development, stimulated by two books—Von Neumann and Morgenstern's "Theory of Games and Economic Behavior" (1944), and Wald's "Statistical Decision Functions" (1950)—has become one of the major areas of research in theoretical statistics.

Roughly speaking, decision theory deals with problems in which one of a number of possible courses of action is to be chosen. The consequences of each action can be measured on some common scale, e.g., in terms of monetary profit or loss or of utility. However, these consequences are known imperfectly because they depend on certain unknown characteristics of the situation.

and because, in many problems, they are random variables rather than fixed amounts. Money can be spent, e.g., on sample surveys or controlled experiments, in order to learn more about the unknown characteristics. Decision theory attempts to develop intelligent rules for determining how much money to spend on data gathering, how to utilize the data, and how to select the course of action.

As might be expected decision theory, in its present state, gives specific solutions only to problems many administrators would consider relatively simple, in the sense that few intangibles enter into the problems. In fact, the subject is further developed on the theoretical than on the applied side. Nevertheless, several decision-making committees, in which this writer has participated, would have profited from the kind of detailed analysis of factors affecting a wise course of action that decision theory forces one to make, even if this analysis did not solve the problem.

This book, developed from a beginning course given at Stanford, is a clear introduction to the subject. Formally, the mathematics required is at a college freshman level; the ability to feel at home with symbols is important for easy reading. Worked examples, although some are rather artificial, give a good idea of the scope of the method.

WILLIAM G. COCHRAN

METROPOLITAN SURVEYS: A DIGEST—By The Government Affairs Foundation, Inc. Chicago, Ill.: Public Administration Service (1313 East 60th St.), 1958. 256 pp. Price, $8.00.

The first part of this book consists of a 22-page summary of 117 general metropolitan surveys in the United States and Canada. It outlines the salient characteristics of the background, purpose, authorization, organization, financing, recommendations, and action on the recommendations. This part was written by Daniel R. Grant, assistant professor of political science, Vanderbilt University.

The second part which constitutes the rest of the book, except for the appendixes, was compiled by various former and current members of the Government Affairs Foundation aided by a host of individuals (4 pages of acknowledgments) and agencies throughout the country. This portion of the book contains a digest of each of the 117 general metropolitan surveys mentioned above; 15 surveys of individual governmental units; and 24 surveys of particular governmental functions such as sewage disposal, public health, transportation, financing, education, etc. The eight appendixes contain a variety of informative definitions and data on the size, population, and number of governmental units in various metropolitan, urban, and rural areas throughout the United States.

The problems of the mushrooming urban populations and their relationship to public health programs and problems that spill into overlapping governmental jurisdictions in metropolitan areas are becoming an increasingly greater concern to state and local public health agencies. General surveys and public health surveys are seen more and more frequently each year. Whether one's primary concern is transportation, education, water purification, sewage disposal, or other aspects of public health that cross political or geographic boundaries, there is often a common bond in the solution of these problems. Methods of approach and recommendations for the solution of problems in one metropolitan area may frequently be of value to other metropolitan areas.

This book and its precursor "Metropolitan Communities: A Bibliography," which includes summaries and references to many specific public health surveys, should provide valuable reference sources for all who are plagued with problems stemming from public

health or other programs that transcend political or geographic boundaries. For those who may be considering the possibility of current or future surveys this digest, which contains the gleanings of hundreds of surveys of metropolitan areas that have been proficiently and systematically summarized, may be able to provide many guides for answers to questions such as: How can the survey be financed; how long is it likely to take; what types of recommendations can be anticipated; what are the chances that recommendations may be carried out? Several of the ten reasons listed in the book for failure, or rejection, or implementation of apparently sound recommendations are valuable leads to common roadblocks which obstruct many a current public health program.

EDWARD PRESS

THE TECHNOLOGY OF FOOD PRESERVATION—By Norman W. Desrosier. Westport, Conn.: Avi Publishing (P. O. Box 388), 1959. 425 pp. Price, $8.50; foreign, $9.50.

This challenging book integrates the subject of food processing with historical, economic, and nutritive aspects. The problem of feeding world peoples, both at present and in the future, is the paramount consideration. How technology can assist in the solution of this problem is set forth in the text. Eleven chapters and a generous and useful appendix make up the volume. The usual processing methods such as refrigeration, freezing, dehydration, canning, fermentation, use of chemicals and ionizing radiations are considered in general terms. In no sense is this text a "cook book." Physical and chemical changes in foods due to processing are well and simply explained. The book is easy to read; highly technical terms are avoided. Neither food analysis, food poisoning, nor the public health aspects of foods are considered in great detail. Perhaps 48 pages is too much space to devote to ionizing radiations in view of the present unimportance and conflicting views of this method of preservation. Otherwise, the book is well balanced and should serve as a good elementary text. On the bookshelf of the public health worker, the book will serve as an important and authentic source of information on food technology.

CARL R. FELLERS

EFFECTIVE SCHOOL HEALTH EDUCATION—By Arthur L. Harnett and John H. Shaw. New York, N. Y.: Appleton-Century-Crofts (35 West 32nd St.), 1959. 421 pp. Price, $4.75.

This text is the most recent addition to the several dealing with the over-all school health program which comprises school health services, healthful school living, and health education.

The authors stress two major points in the content presented and in their plan of organization, namely, (1) the opportunities and responsibilities of the classroom teacher in the broad area of the school health program and (2) the cooperative action needed for effective education for health.

The book is divided into three major areas: I. Health Education Today with three chapters; II. The School Health Program with six chapters; and III. Health Teaching in the Schools with five chapters. There is also an appendix containing resource units and other helpful material.

The book is not primarily a methods or curriculum book, therefore its purpose and content would have been conveyed more readily to the prospective user if the title had been "Effective School Health Program." Otherwise, this text is a valuable addition to the school health field and should be helpful to both teachers and prospective teachers, nurses, school administrators, and others vitally concerned with the health needs of children.

H. FREDERICK KILANDER

THE COMPLETE EMPLOYEE—A HANDBOOK FOR PERSONNEL APPRAISAL—By Robert Winthrop Adams. Chicago, Ill.: Public Administration Service (1313 East 60th St.), 1959. 68 pp. Price, $2.00.

This handbook represents articles by the author first appearing in "Factory Management and Maintenance" (April, 1951) reprinted through the courtesy of McGraw-Hill Publishing Company, and in "Supervision" (January, 1958) by G. G. Stern. The book is primarily a vocabulary of some 2,000 words and phrases to be used in describing people from the points of view of (1) mental capacity; (2) work habits and attitudes; (3) stability; and (4) ability to get along with others. Words are grouped under these four main points of view, 51 subheads, and many sub-subheads. Favorable characteristics are listed in left columns, unfavorable characteristics in right columns. Introductory chapters tell how and where to use the vocabulary in describing people and offers a non-objective but concise method of describing job performance. It may be of interest to those administrators and supervisors who want a job-performance rating plan which is meaningful to employees. CHARLES B. FRASHER

HOSPITAL UTILIZATION UNDER INSURANCE—MONOGRAPH SERIES NO. 6—By Milton I. Roemer and Max Shain. Chicago, Ill.: American Hospital Association (840 North Lake Shore Drive), 1959. 39 pp. Price, $1.75.

This is a timely, thoughtful, and useful review of the problems of use of general hospitals in the United States today. With an exhaustive bibliography of the literature and a framework for viewing the problems and issues, the following factors were suggested as important:

1. Patient factors: (a) incidence and prevalence of illness; (b) attitudes toward illness; (c) cost of medical care to the patient; (d) marital status; and (e) housing and social level.

2. Hospital factors: (a) supply of beds; (b) efficiency of bed utilization; (c) financing hospital costs; (d) availability of alternative bed facilities; and (e) strength of outpatient department.

3. Physician factors: (a) supply of physicians; (b) method of medical remuneration; (c) nature of community medical practice; (d) medical policies in the hospital; (e) level of medical alertness; and (f) medical teaching needs.

The authors are not suggesting that hospitals are overused, underused, or used correctly because there are no definitive data. Accordingly, a plea is made for well-conceived and executed research in this important area of public policy. Their review is a great help in setting the stage for judicious planning to that end. ODIN W. ANDERSON

DDT—THE INSECTICIDE DDT AND ITS SIGNIFICANCE (VOL. II)—Human and Veterinary Medicine. Edited by S. W. Simmons. Basel, Switzerland: Birkhauser AG, 1959. 570 pp. Price, sFr.66.

The scope of this second volume on DDT is indicated by the titles of its three sections, and its excellence is assured by the names of the authors: VI—Pharmacology and Toxicology of DDT by Wayland J. Hayes, Jr.; VII—The Use of DDT Insecticides in Human Medicine by Samuel W. Simmons; VIII—The Use of DDT in Veterinary Medicine by E. F. Knipling.

The important section on Pharmacology and Toxicology might well have been recognized in the title. For the American audience, the term "Human and Veterinary Medicine" might have been changed to "The Prevention of Human and Animal Diseases," to emphasize the public and veterinary health importance of DDT.

The three sections present a compilation and analysis of information from a surprisingly large list of publications covering all parts of the world. The selected bibliography is invaluable

for those who study, manufacture, or use DDT in any way. The history of the development and introduction of DDT is very well done.

The reviewer's disappointment in finding a volume prepared for publication in 1956 but appearing in 1959, does not diminish his appreciation of the 1956 effort. The preparation today of such a work would permit a more adequate perspective of the eventual results of the introduction of DDT with the presentation of the stories of occasional successes in species eradication campaigns and the progress in the world malaria eradication program, sponsored by the Pan American and World Health Organizations with the support of UNICEF and ICA. FRED L. SOPER

SAFE HANDLING OF RADIOISOTOPES—By the International Atomic Energy Agency, Vienna, 1958. New York, N. Y.: UNESCO Publications Center (801 Third Ave.), 1958. 99 pp. Price, $1.00.

This manual which is particularly addressed to "small scale users" is a well organized compilation of safety rules covering just about every situation that might be encountered in using radioactive materials. If all of the rules were carefully followed, it is hard to see how anyone could ever be overexposed.

Experience has shown, however, that when such a distinguished group formulates rules of practice, as in the case of our own NCRP, the rules are taken very seriously and often embodied in codes and laws. Such warnings as we read in the Introduction that they "should be interpreted with scientific judgment" are often overlooked. Writers of guides such as this, therefore, have a serious responsibility to determine that each rule is (a) necessary for safety, (b) universally applicable unless stated otherwise, and (c) will not cause unreasonable hardship to some.

Many of the rules given fail to meet this test, particularly those concerning medical examinations, intramural transportation, sealed and unsealed sources. The manual does not appear to distinguish between trivial and important sources in setting up procedures. It would be the "small scale users" without the facilities available to others to which many of the rules need not apply.

The manual is, however, an excellent set of reasonable recommendations if scientifically interpreted and properly used. HANSON BLATZ

THE DRINKING PROBLEM . . . AND ITS CONTROL—By C. A. D'Alonzo. Houston, Tex.: Gulf Publishing (P. O. Box 2608), 1959. 130 pp. Price, $2.95.

Wherever there are people and alcohol, alcoholism will exist. Wherever alcoholism exists all persons share in the evil results, whether in increased perils on the highway or in increased taxes to support the indigent made so by alcohol. The E. I. Dupont de Nemours Company, through its Medical Department, has long been acclaimed for its contributions to the control of alcoholism. This book is a product of that experience but in singular fashion it is the product of one Dupont medical staff member, the author, the assistant medical director.

It is no paradox to say that this book is objective and factual and at the same time warm and understanding. But the alcoholic does not understand himself; neither does his family; neither does the family physician nor the psychiatrist. He is described as infantile, recessive, neurotic, selfish, irresponsible; all this may be when drinking. The alcoholic when sober is just like the sober nonalcoholic. He is the person working or living next to you; he is indistinguishable by personality, type, appearance, mannerism, or character from the other people about the office or home; he is not a type, a character, or of a particular build, but just a person. When he is drinking, however, he is apprehensive, anxious, jittery, perspiring, bleary-eyed,

sloppy, suggestible, unfaithful, untruthful, easily swayed, and weak. When his drinking reaches the point where he has "the shakes," he is a mess; a pathetic and perspiring mass of tremors and jerks, with a sullen and painful expression, with an untidiness and dissipation that is characteristic. He is, in brief, the kind of guy you would prefer not to see or talk to, but would rather cross the street to avoid.

All this is presented under these captions: What Is Alcoholism?, Some Characteristics of the Alcoholic, The 8 Stages of Progression and Their Recognition, Medical Aspects, Community Problems Related to Alcohol, Sobriety and its Attainment, Treatment, Alcoholics Anonymous, Industry's Role in the Problem of Alcoholism, Appendix: I am an Alcoholic—This Is My Story, A Study of Why Those "Cured" of Alcoholism Stopped Drinking.

The alcoholic is the loneliest person in the world. The author may profess that he little understands this wretched soul, but this little book proves that the reach of his understanding is immense.

CAREY P. MCCORD

CANCER IN FAMILIES: A STUDY OF THE RELATIVES OF 200 BREAST CANCER PROBANDS—By Douglas P. Murphy and Helen Abbey. Cambridge, Mass.: Harvard University Press (Published for the Commonwealth Fund), 1959. 74 pp. Price, $2.50.

This report of a retrospective study is designed particularly in answer to the question—does cancer occur more frequently in relatives of a person who has cancer, than in relatives of a person who does not? It also assesses the magnitude of difference between the several relationships. The book is arranged in four sections: the first reviews and discusses the pertinent literature; the second deals with the authors' methods; the third, with findings arranged in 35 tables; and the fourth gives the conclusions. There are an additional 11 tables of data in the appendixes and two pages of references.

The study reveals no differences in the frequency of cancer which are of statistical significance between relatives of the cancer and of control probands. Statistically speaking the report is quite acceptable; however the data reveal a paucity of reported cases among relatives which were confirmed by biopsy.

Another potentially weak point of some concern is the inclusion of aunts and uncles by marriage as blood relatives. In summary, the report is interesting and contains much valuable data, but after reading it one cannot help but feel that there is no overwhelming evidence in support of a thesis that heredity is, or is not, involved in the incidence of breast cancer.

LEONID S. SNEGIREFF

YOUTH AND FITNESS. A PROGRAM FOR SECONDARY SCHOOLS — Washington, D. C.: American Association for Health, Physical Education and Recreation (1201 16th St., N.W.), 1959. 80 pp. Price, $1.50.

This pamphlet reports the recommendations of the National Conference on Fitness of Secondary School Youth, held in Washington in December, 1958, for which the American Association for Health, Physical Education and Recreation was the sponsoring organization. Cooperating organizations included the President's Council on Youth and Fitness, the Amateur Athletic Union of the United States, the U. S. Office of Education, the National Congress of Parents and Teachers, the Association of State and Territorial Health Officers and a number of groups representing teachers and school administrators.

The main conference goal was stated as follows: "To contribute to youth fitness by recommending ways of strengthening secondary school programs in the areas of health, safety, physical education, athletics, recreation, driver education, and outdoor education." The con-

ference agreed not to include health services for adolescents in their discussion or recommendations. The recommendations are limited to the areas listed and are set forth in some detail.

The report recommends the strengthening of health education and physical training at a time when there is pressure on secondary schools to give more time to teaching the sciences and foreign languages. The reader may have his own opinion as to the relative importance of these fields. One has the impression in reviewing the recommendations that, aside from recommending full-time use of the school plant and encouraging wider use of community parks and other outdoor areas, there is little that is new or constructive in the report.

The section called The Changing Scene reports several addresses including The Social and Economic Setting for American Education; Advances in Health and Medical Sciences; and The Growth and Development of Today's Adolescent. These papers are of special interest to public health personnel in pointing out the problems to be considered in developing a program for Youth and Fitness. REGINE K. STIX

ANNOTATED GUIDE TO FREE AND INEXPENSIVE HEALTH INSTRUCTION MATERIALS—By John R. LeFevre and Donald N. Boydston. Carbondale, Ill.: Southern Illinois Press, 1959. 71 pp. Price: cloth $5.00, paper $2.50.

This little booklet is a listing of sources of health instruction materials for classroom use in grades 1 through 12 and for college. Materials included are those listed as selling for $1 or less. Doubtless this listing will be of some use although the reviewer with his bias believed that there were certain important omissions. He assumed that students at certain of these grade levels might be interested in learning something about public health and might be interested in finding prepared bibliographies helpful in locating library materials on various subjects. The guide is notably deficient in these two respects. Although there were some individual leaflets pertaining to groups of the health profession, the reviewer failed to find an entry on the health careers materials of the National Health Council and it seemed that health instruction materials for high school and college level students might well include such references. THOMAS R. HOOD

MEDICAL CARE FOR WELFARE RECIPIENTS—CALIFORNIA—By Margaret Greenfield. Berkeley, Calif.: University of California Bureau of Public Administration, 1959. 215 pp. Price, $3.00.

Ten years ago, the American Hospital Association published a report entitled "The Disorder in Indigent Care." This might very well have served as a subtitle for Miss Greenfield's excellent monograph on medical services for California's welfare recipients, as it was before the current state-wide program went into operation.

The report is replete with detail on the enormous differences between counties on such important items as determination of eligibility, scope of services, and quality of care. This is probably best pointed out by a quotation from the book: "Both quality and availability of county care are dependent on many factors: Size and wealth of county, type of economy, adequacy of professional resources, local definition of medical indigence, as well as traditional county attitudes toward social dependency. All of these factors vary widely from one end of the state to the other and from mountain to valley to coast."

The book is an eloquent testimonial to the chaos that can easily reign in a large state which leaves such basic matters to local government without providing clearly defined rules which are binding on all areas of the state.

In addition, the book is useful because it provides a benchmark for the medical services to welfare recipients which were available before the current state-supervised program became effective in October, 1957. As such it may be useful to anyone wishing to analyze the effects of the new program. A short appendix describing the new program will help bring the reader up to date with relation to the current situation in California.

All in all, this is a useful addition to the library of anyone interested in public welfare medical services.

HERBERT NOTKIN

GRADUATE EDUCATION FOR HOSPITAL ADMINISTRATION—Edited by Ray E. Brown. Chicago, Ill.: University of Chicago Press (950 East 59th St.), 1959. 190 pp. Price, $3.00.

Formal university training in hospital administration began at the University of Chicago in 1934. This volume presents 22 papers offered at the 25th anniversary of this event. Half are by observers in the hospital field generally and the other half are by representatives of the university training programs.

The outstanding contribution is the paper by Michael M. Davis, founder of the Chicago program, in which he reviews the origin of this field of training, epitomizes current trends in hospital service, and formulates critical choices for the future. The central issue in the years ahead, he states, is "the alternative between the voluntary general hospital as a community medical center and the hospital as a workshop for the paying practice of medicine." He hopes that educators will inculcate in their students "the community objective."

Other papers review the relationships of the 17 graduate training programs to the hospital field, the various hospital associations, the foundations, and to universities as a whole. The influence of two major studies of hospital administration training (1945 and 1954) is considered by their directors. Professorial representatives of the programs discuss operating problems like curriculum planning, research, staffing, financing, the administrative residency, etc. Education beyond the master's degree is explored in two papers.

Both the strengths and weaknesses of current training for hospital administration in the United States are reflected in this volume. One is strongly impressed with the maturation of this field of work in the last quarter-century and the degree to which university training has contributed to the professionalization of its ranks. At the same time, one readily detects the uncertainties in both objectives and methods that persist. For this reason the book is an extremely valuable record of the current status of a relatively new specialty in the health world, as well as the important role of higher education in its continuing development. MILTON I. ROEMER

FOOD. THE YEARBOOK OF AGRICULTURE 1959—U. S. Department of Agriculture. Washington, D. C.: Government Printing Office, 1959. 736 pp. Price, $2.25.

The Department of Agriculture is to be congratulated for making available this excellent book. Your congressman may be able to get you a copy of "Food," or you can pay the Superintendent of Documents $2.25 for it. In either event, it is worth getting. It belies the general rule that if a book is interesting it is unreliable, and if reliable it is dull.

Topics include dietary needs of different groups, nutrients, public health aspects of food, menus, recipes, costs, and a wealth of other information relating to food—all treated in sound but lively fashion. The book is equally appropriate whether in a professional library or on a home bookshelf. The present volume is the most recent in the annual series that began in 1849 and that hopefully will continue in the future.

BOOKS RECEIVED

Listing in this column acknowledges the receipt of books and our appreciation to the senders. Space and the interests of readers will permit review of some, but not all, of the books listed.

ACCREDITATION—THE STRUGGLE OVER STANDARDS IN HIGHER EDUCATION. William K. Selden. Washington, D. C.: National Commission on Accrediting, 1960. 138 pp. Price, $2.50.

AIR POLLUTION CONTROL. W. L. Faith. New York, N. Y.: Wiley, 1959. 259 pp. Price, $8.50.

ANALYSIS AND EVALUATION OF THE GENERAL HOSPITAL SERVICE AREAS. Department of Health, Commonwealth of Puerto Rico. Cambridge, Mass.: Associated Consultants, 1959.

ARTHRITIS: MEDICAL TREATMENT AND HOME CARE. John H. Bland. New York, N. Y.: Macmillan, 1960. 208 pp. Price, $4.95.

ATOMIC RADIATION. PART II. MONITORING-RADIATION PROTECTION-RADIOACTIVE SHIPMENT-WASTE DISPOSAL. Camden, N. J.: RCA Service Company, 1960. 117 pp. Price, $2.65.

BIOLOGY OF THE PLEUROPNEUMONIALIKE ORGANISMS. Otto v. St. Whitelock, Editor in Chief. New York, N. Y.: New York Academy of Sciences, 1960. pp. 305-758. Price, $5.00.

COMPARATIVE STUDIES IN ADMINISTRATION. James D. Thompson, et al. Pittsburgh, Pa.: University of Pittsburgh Press, 1959. 224 pp. Price, $6.00; paperbound $3.95.

CONTROL OF COMMUNICABLE DISEASES IN MAN (9th ed.). An Official Report of the American Public Health Association. New York, N. Y.: A.P.H.A., 1960. 234 pp. Price, $1.00 paper; $2.50 cloth.

EDUCATION OF AMERICAN BUSINESSMEN. A STUDY OF UNIVERSITY-COLLEGE PROGRAMS IN BUSINESS ADMINISTRATION. Frank C. Pierson and Others. New York, N. Y.: McGraw-Hill, 1959. 740 pp. Price, $7.50.

EPIDEMIOLOGY OF MENTAL DISORDER. Benjamin Pasamanick, Editor. Washington, D. C.: American Association for the Advancement of Science, 1959. 295 pp. Price, $6.50; prepaid to AAAS Members $5.75.

GESTATION. Transactions of the Fifth Conference March 11-13, 1958. Claude A. Villee. New York, N. Y.: Josiah Macy, Jr. Foundation, 1959. 262 pp. Price, $5.75.

HEALTH EDUCATION MONOGRAPHS. Oakland, Calif.: Health Education Monographs, 1959. $1.00 each. (Attn. H. J. Weddle.)

HEALTH WORKERS' ATTITUDES TOWARD COMMUNITY DEVELOPMENT PROGRAMS. No. 4. William Griffiths. 38 pp.

THE PUBLIC HEALTH WORKER AS AN AGENT OF SOCIO-CULTURAL CHANGE. No. 5. Cora Du Bois. 19 pp.

OPERATIONAL RESEARCH IN HEALTH EDUCATION. No. 5. Kenneth D. Benne. 8 pp.

MOTIVATION — SOME BASIC PSYCHOLOGICAL ISSUES. No. 6. Richard S. Lazarus. 11 pp.

MOTIVATION IN SMALL GROUPS. No. 6. Edmund H. Volkart. 14 pp.

POWER AND PARTICIPATION IN THE LOCAL COMMUNITY. No. 6. William Kornhauser. 12 pp.

HERITABLE DISORDERS OF CONNECTIVE TISSUE (2nd ed.). Victor A. McKusick. St. Louis, Mo.: Mosby, 1960. 333 pp. Price, $12.00.

HISTORICAL SOCIOLOGY: THE SELECTED PAPERS OF BERNARD J. STERN. New York, N. Y.: Citadel Press, 1960. 433 pp. Price, $5.00.

INTERPROFESSIONAL TRAINING GOALS FOR TECHNICAL ASSISTANCE PERSONNEL ABROAD. Report of an Interprofessional Conference on Training of Personnel for Overseas Service. New York, N. Y.: Council on Social Work Education, 1959. 198 pp. Price, $3.00.

LIBERAL EDUCATION AND NURSING. Charles H. Russell. New York, N. Y.: Columbia University, Teachers College, 1959. 152 pp. Price, $3.00.

LIVE POLIOVIRUS VACCINES. Papers Presented and Discussions Held at the First International Conference on Live Poliovirus Vaccines. Washington, D. C.: Pan American Sanitary Bureau, 1959. 713 pp. Price, $5.00.

MANUAL OF APPLIED NUTRITION OF THE JOHNS HOPKINS HOSPITAL. Janette Carlsen. Baltimore, Md.: Johns Hopkins Press, 1959. 134 pp. Price, $3.00.

MODERN NUTRITION IN HEALTH AND DISEASE DIETOTHERAPY (2nd ed.). Edited by Michael G. Wohl and Robert S. Goodhart. Philadelphia, Pa.: Lea & Febiger, 1960. 1152 pp. Price, $18.50.

PAPERS PRESENTED AT SIXTH ONTARIO INDUSTRIAL WASTE CONFERENCE. June 14-17, 1959, Delawana Inn, Honey Harbour, Ontario. Toronto, Canada: Water and Pollution Advisory Committee, Ontario Water Resources Commission, 1959. 306 pp.

PEACEFUL USES OF ATOMIC ENERGY: PROCEEDINGS OF THE SECOND UNITED NATIONS INTERNATIONAL CONFERENCE IN GENEVA, September, 1958:

WASTE TREATMENT AND ENVIROMENTAL ASPECTS OF ATOMIC ENERGY. Vol. 18. 624 pp. Price, $16.50.

HEALTH AND SAFETY: DOSIMETRY AND STANDARDS. Vol. 21. 249 pp. Price, $10.50.

BIOLOGICAL EFFECTS OF RADIATION. Vol. 22. 552 pp. Price, $14.50.

EXPERIENCE IN RADIOLOGICAL PROTECTION. Vol. 23. 453 pp. Price, $14.50.

ISOTOPES IN MEDICINE. Vol. 26. 460 pp. Price, $13.00.

New York, N. Y.: United Nations, Sales and Circulation Section, 1958.

PERSPECTIVES IN PEDIATRIC VIROLOGY. Report of the Thirty-Third Ross Conference on Pediatric Research. Columbus, Ohio: Ross Laboratories, 1959. 91 pp.

POPULATION EXPLOSION AND CHRISTIAN RESPONSIBILITY. Richard M. Fagley. New York, N. Y.: Oxford University Press, 1960. 260 pp. Price, $4.25.

PROCEEDINGS OF THE THIRD MEDICAL AND EDUCATIONAL CONFERENCE OF THE AUSTRALIAN CEREBRAL PALSY ASSOCIATION. Perth, Western Australia, September 27-30, 1957. Western Australia, Mt. Lawley: The Spastic Welfare Association of Western Australia, 1960. 205 pp.

PROCEEDINGS OF THE EIGHTH ANNUAL CONFERENCE. The Institute of Public Administration of Canada, 1956. Edited by T. Clark and F. J. McGilly. Toronto, Canada: University of Toronto Press, 1959. 343 pp. Price, $6.00.

PROGRESS IN MEDICAL VIROLOGY. Edited by H. Berger, et al. New York, N. Y.: Hafner, 1959. 234 pp. Price, $10.25.

PROVISION OF POPULAR READING MATERIALS. A collection of studies and technical papers, compiled and edited by Charles Granston Richards. New York, N. Y.: UNESCO Publication Center, 1959. 298 pp. Price, $3.00.

PUBLIC ASSISTANCE MEDICAL CARE: AREAS OF NEEDED RESEARCH AND AN ANNOTATED BIBLIOGRAPHY. S. J. Axelrod. Chicago, Ill.: American Public Welfare Association, 1959. 63 pp. Price, $2.00.

RECENT ADVANCES IN NEURO-PHYSIOLOGICAL RESEARCH. Edited by D. Ewen Cameron and Milton Greenblatt. Washington, D. C.: American Psychiatric Association, 1959. 136 pp. Price, $2.00.

RECREATION ACTIVITIES FOR THE HANDICAPPED. Frederick M. Chapman. New York, N. Y.: Ronald Press, 1960. 309 pp. Price, $5.75.

SOCIAL WORK YEAR BOOK 1960. Russell H. Kurtz. New York, N. Y.: National Association of Social Workers, 1960. 767 pp. Price, $8.50.

SOCIOLOGICAL STUDIES OF HEALTH AND SICKNESS. Edited by Dorrian Apple. New York, N. Y.: McGraw-Hill, 1960. 350 pp. Price, $7.50.

STORY OF DISSECTION. Jack Kevorkian. New York, N. Y.: Philosophical Library, 1959. 80 pp. Price, $3.75.

TRAINING FOR CLINICAL PSYCHOLOGY. Proceedings of the Springfield-Mount Sinai Conferences on Intern Training in Clinical Psychology. Edited by Michael H. P. Finn and Fred Brown. New York, N. Y.: International Universities Press, 1960. 186 pp. Price, $4.00.

WEIGHT GAINS, SERUM LEVELS, AND HEALTH OF BREAST FED AND ARTIFICIALLY FED INFANTS, FULL TERM AND PREMATURE. B. Levin; H. M. M. Mackay, et al. London, England: Director of Publications. Her Majesty's Stationery Office, 1959. 154 pp. Price, 16.s. Net.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Raymond S. Patterson, Ph.D., F.A.P.H.A.

Word to the Wise—Average weights for women are now lower than those found in earlier surveys. Men are heavier today. Apparently women take weight control advice more seriously than men. These new tables are set forth in the first of a series of articles dealing with "Build and Blood Pressure Study, 1959" published by the Society of Actuaries.

ANON. New Weight Standards for Men and Women. Statist. Bull. Metrop. Life Insur. Co. 40, 12:1 (Nov.-Dec.), 1959.

Swinging Pendulum — The hundred-year history of the section of the AMA that has dealt, under differing names, with one aspect or another of public health, reflects the succession of changes in the practice of sanitation and preventive medicine. A nice point is made of our having run the full circle, and once again we are coming to grips with environmental hazards—or benefits—to human health in air and water.

BIERRING, W. L. Preventive Medicine—Its Changing Concepts 1859-1959. J.A.M.A. 171, 16:2190 (Dec. 19), 1959.

Pulling Together — Acceptance of joint responsibility for preschool child health by health officer, pediatrician, general practitioner, health visitor, et al., is the outstanding point driven home in this (Br.) symposium. Perhaps the teamwork there, in solving the problems of the small child's health in the family setting, may not be as closely pulled together as the collected papers would seem to indicate, but chances are it is closer than in our go-it-alone community organizational setups.

BURN, J. L., et al. The Maintenance of Family Life in Relation to Children Under Five in the Present-Day Social Structure. Roy. Soc. Health J. 79, 6:750 (Nov.-Dec.), 1959.

Good Research—You are, no doubt, aware that culex mosquitoes transmit St. Louis encephalitis. Even so, you will feel well repaid for your trouble in hunting up this paper simply because it is an example of careful research. It brings to light the possible reasons for the relative importance of the various species in transmitting the disease in the middle United States and the far west.

CHAMBERLAIN, R. W., et al. St. Louis Encephalitis Virus in Mosquitoes. Am. J. Hyg. 70, 3:221 (Nov.), 1959.

From Britain—This is passed on to you for whatever use you may make of it. During the Asian influenza outbreak (1957-1958) 603 pregnant women said they had had influenza during their pregnancy. Incidence of congenital deformities was 2.4 times that of control experience (and almost all deformities were in the central nervous system).

COFFEE, V. P., and JESSOP, W. J. E. Maternal Influenza and Congenital Deformities. Lancet 7109:935 (Nov. 28), 1959.

Fluorine and Caries—In Lubbock, Tex., with too much fluorine in the water (3 to 4 ppm), no beneficial effects in the prevention of caries seemed to be attributable to the excess fluorine; but in Philadelphia, with controlled

fluoridation in effect for only four years, children already were beginning to show an improvement that would indicate benefits to come, comparable to the 60 per cent reductions in caries recorded in other cities.

LAMB, M. W., and FORD, E. Dental Health of Children in the Fourth Grade of Four Elementary Schools in Lubbock, Texas; (and) COHEN, A. Dental Examinations Show Benefits of Water Fluoridation. J. School Health 30, 1:15 (Jan.), 1960.

Suicide—Is suicide a proper concern of public health? If it is in part preventable, one might assume that it must have a place in public health practice. This four-part paper seems to promise an answer to the question. Part 4, still to come, will concern itself with the prevention and control of this tragically frequent cause of untimely death.

HIRSH, J. Suicide. Ment. Hyg. 43, 4:516 (Oct.), 1959.

Mentally Retarded Tots — Discussed in a (Br.) paper are: (1) the very early discovery of mentally retarded children; (2) supervised care by the mother to remove impediments to mental maturation; and (3) special educational services during the early school years. The authors assert that the recommended measures result in a considerable salvage of children who would otherwise have drifted into life-long institutional care. A persuasive story of an American venture in this same field will be found at the close of this bibliography (see Weiss, R. C.).

JONES, G. R., et al. The Preventive Approach to Mental Retardation. M. Officer 102, 22:277 (Nov. 27), 1959.

Step-Child—Have you any responsibility whatever in the matter of narcotic addiction? Have you heard that the British have a successful scheme? Then this paper is for you. In brief, the answers to the second question seem to be: the British have a problem less serious than ours; medical oversight can be closer, thanks to the National Health Service; the essentials in the treatment methods, there and here, are not as dissimilar as one would suppose; their plan is not much more productive than ours; narcotic addiction needs much more study than it is getting in either country.

LARIMORE, G. W., and BRILL, H. The British Narcotic System. New York J. Med. 60, 1:107 (Jan. 1), 1960.

Family Affair—This may be only tangentially a matter of public health for it is mostly about pharmaceutical business practices with a little discussion of scientific research. As this will continue in a high place in congressional and public discussion this paper's within-the-family airing should help to give us a balanced understanding of the pros and cons. Quite incidentally it was a very fine speech—as a speech.

LASAGNA, L. Gripesmanship: A Positive Approach. J. Chronic Dis. 10, 6:459 (Dec.), 1959.

Periodic Check-Ups—A cross-section group of 900 first-grade school children were followed up with careful annual medical examinations. Most of the handicapping conditions that were brought to light by them were already under care, so it is concluded that such examinations during the elementary school years are of little value in case finding. An Atlantic City meeting paper.

LAWRENCE, R. A. Experiences of a New York State Four-Year Evaluation Study. J. School Health 29, 10:378 (Dec.), 1959.

Local Refresher Courses—Inservice, brush-up courses for health officers and sanitary inspectors offered by the Department of Preventive Medicine by one Canadian University are described. The author points out that the intention is not to compete with schools of hygiene but that, where distances or economic considerations are major obstacles to attendance at them, the other universities can supplement the teaching of the schools of hygiene.

MATHER, J. M. The Role of the University in the Education of Public Health Workers. Canad. J. Pub. Health 50, 12:504 (Dec.), 1959.

What's Your Guess?—In a big, short-stay, boys' camp would the inadequately chlorinated swimming pool, or personal contact in house groups be the more productive agent for spread of infection? In this reported experience, exposure to communal objects (including the swimming pool) did not enhance the risk of infection: living in a cabin with an infected boy did!

PAFFENBARGER, R. S., et al. Viruses and Illnesses in a Boys' Summer Camp. Am. J. Hyg. 70, 3:254 (Nov.), 1959.

"Et Al (Their Pals)"—This you must read! The inimitable Hugh Paul is back again. This time he deals with the doubters who work industriously at pulling the props out from under the lung cancer studies. What this country needs, more than the proverbial good five-cent cigar, is a native Hugh Paul.

PAUL, H. Gimme a Gasper, Mate! M. Officer 102, 23:297 (Dec. 4), 1959.

Un-Health Examinations—Almost all the 10,709 men and women—who considered themselves well and unsymptomatic—had some pathologic organic or functional condition. Types of diseases uncovered were consistent throughout the 12-year period. The findings underscore the value of multiphasic health examinations. A second paper reports upon the nature and distribution of newly discovered diseases found among executives. Both papers are recommended reading.

SCHENTHAL, J. E. Multiphasic Screening of the Well Patient: (and) ELSOM, K. A., et al. Periodic Health Examination. J.A.M.A. 172, 1:1 (Jan. 2), 1960.

Thrombi Following Fractures—An anticoagulant was given half the injured (and elderly) patients receiving care for fracture of the hip. Thrombosis was prevented and the risk of pulmonary embolism greatly reduced. The prophylaxis was found to be safe.

SEVITT, S. Prevention of Venous Thrombosis and Pulmonary Embolism in Injured Patients. Lancet 7110:981 (Dec. 5), 1959.

Changing Times—Two papers on ways that schools and community agencies can collaborate in the education of public health nurses have much in them of interest for those who are struggling with training in other areas of the public health field. In one paper is this cute fable: an alumnus was shown by his old professor of economics the current examination questions. He exclaimed: "But those are the same questions you asked us. Don't you know that students pass the questions along?" "Yes," said the old professor, "I know, but in economics, we change the answers." The moral is: in public health too—we must change some of the answers.

TSCHUDIN, M. S., and NOTTER, L. Preparation of Basic Students for Public Health Nursing. Nursing Outlook 8, 1:16 (Jan.), 1960.

Shorter Stay—In this (Br.) hospital they needed more beds for antenatal care, so they reduced the number assigned for lying-in, by sending most of the mothers home after 48 hours to be visited by domiciliary midwives. The baby had to be healthy, of course, he had to be at least 6½ pounds, the mother should be fit to move and the home conditions satisfactory. Says the author, the short stay does not endanger mother or baby, spares the baby from hospital staphylococcic infection; it savors of common sense, and may indicate future obstetric patterns.

THEOBALD, G. W. Home on the Second Day: the Bradford Experiment. Brit. M. J. 5163:1364 (Dec. 19), 1959.

Educating the Handicapped—A survey of special services that boards of education of the large cities across the

land provided for children with rheumatic fever or heart handicaps revealed a great variety of services, policies, and personnel. The findings are the basis for ten proposals dealing with periodic review of children's conditions and their needs, with an aim of modifying the care to fit the child rather than keeping the child in a setting which is no longer appropriate.

WALLACE, H. M. Educational Services for Urban Children with Rheumatic Fever or Heart Disease. Pub. Health Rep. 74, 12:1041 (Dec.), 1959.

Mentally Handicapped — Helping retarded children to use their limited talents to attain the best possible development must be a heart-warming experience. Guiding and helping their beleaguered parents to keep them must also be rewarding. The well told story of what one ex-mental hospital nurse has done—as an antidote to domestic boredom—is the source of the above flight of philosophic fancy.

WEISS, R. C. A Creative Workshop for Retarded and Emotionally Disturbed Children. Nursing Outlook 7, 12:716 (Dec.), 1959.

If additional information is desired regarding the articles listed in this bibliography, please communicate directly with the publication in which they appeared: the addresses are furnished for your convenience.

Am. J. Hyg. (American Journal of Hygiene), 615 N. Wolfe St., Baltimore 5, Md.
Brit. M. J. (British Medical Journal), British Medical Association House, 19 Tavistock Sq., London, W.C.1, England.
Canad. J. Pub. Health (Canadian Journal of Public Health), 150 College St., Toronto 5, Canada.
J.A.M.A. (Journal of the American Medical Association), 535 N. Dearborn St., Chicago, Ill.
J. Chronic Dis. (Journal of Chronic Diseases), C. V. Mosby, 3207 Washington Blvd., St. Louis 3, Mo.
J. School Health (The Journal of School Health), American School Health Association, 515 East Main St., Kent, Ohio.
Lancet, 7 Adams St., Adelphi, London, W.C.2, England.
M. Officer (Medical Officer), Chronicle House, 72-78 Fleet St., London, E.C.4, England.
Ment. Hyg. (Mental Hygiene), National Association for Mental Health, 10 Columbus Circle, New York 19, N. Y.
New York State J. Med. (New York State Journal of Medicine), 386 Fourth Ave., New York, N. Y.
Nursing Outlook, American Journal of Nursing Company, 10 Columbus Circle, New York 19, N. Y.
Pub. Health Rep. (Public Health Reports), Gov. Ptg. Office, Washington, D. C.
Roy. Soc. Health J. (Royal Society for the Promotion of Health Journal), 90 Buckingham Palace Road, London, S.W.1, England.
Statist. Bull. Metrop. Life Insur. Co. (Statistical Bulletin of the Metropolitan Life Insurance Company), 1 Madison Avenue, New York 10, N. Y.

CREDIT LINES

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Owls Are Wise . . .

Some students of ornithology to the contrary notwithstanding. At least in a new health education movie, "The Owl and Fred Jones," it is a wise owl that talks the hero into changing one of his habits . . . overeating. Owl shows Fred how to go about solving this health problem—how to plan for and carry out the activities of S (for starting) Day. Habit-change does take planning—the central theme of this educational piece.

Since the intent of the film is to teach, its first step toward success may be measured by the degree to which the viewer identifies himself with Fred. One might well question the sense of humor and reality of a viewer who did not find at least one of his feet in Fred's shoes by the end of the film. This fine blend of comic spirit and good pedagogy should help many people manage their health better.

Produced by the Equitable Life Assurance Society, Bureau of Public Health, as part of its "Assurance of a Fuller Life" health education and public service program. In full animation and color; 16mm:11½ minutes. For a free film showing address Modern Talking Picture Service, Inc., 3 East 54th Street, New York 22, N. Y. Please give alternate dates.

A Visiting Nurse Home Care Plan

The Visiting Nurse Society of Philadelphia has summarized the first decade of its Home Care Plan. In a brief pamphlet entitled "10 Years of Progress," its experience in home care for the chronically ill, not a unique service but one with a unique approach, is described. The pamphlet is undoubtedly available to others. The Philadelphia Home Care Plan, 1340 Lombard Street, Philadelphia 47, Pa.

The Face of Public Health Nursing

"Public Health Nursing Service to Patients" is "for the first time, a comprehensive profile of the services rendered to clients of public health agencies" thus setting "the dimensions of public health nursing service and . . . providing basic data essential to establishing patterns of staffing and service." Ruth B. Freeman, in a foreword, suggests that "this should provide a basic document for use by public health nurses and administrators." Hitherto little known areas of nursing services are identified and documented in this monograph. The study on which it is based was carried on over a two-year period, in health departments and agencies selected because they conformed to the recommended practices of the American Public Health Association and the National League for Nursing. Three earlier reports on the data of this study have already been published.*

The author is Marion Ferguson, Ph.D., consultant, Division of Public Health Nursing, Public Health Service. Pub. Health Monograph No. 59. Single copy free from Public Inquiries Branch, Public Health Service. Quantities from U. S. Government Printing Office, Washington 25, D. C. 40 cents each.

* Participation of Staff of Different Agencies in Data Collection. Marion Ferguson and Jeanette Westlake, Nursing Res. (Feb.), 1958. Public Health Nursing Services Provided in Households. Marion Ferguson and Mary Ellen Patno, Pub. Health Rep. (July), 1958. Family Health Service Opinions Versus Facts. Marion Ferguson and Walborg Wayne, Nursing Outlook (Nov.), 1958.

Self-Survey Forms for Farm Bureaus

The June, 1957, Journal carried an article (pages 725-731) describing "A Self-Survey of Public Health Needs: Warren County, N. J." The survey forms used in this self-appraisal pilot study had been developed over a period of several years by the Rural Health Committee of the New Jersey Welfare Council. The survey schedules have now been revised in the light of this study-group's experience in Warren County. The American Farm Bureau Federation has in turn recommended the revised schedules to the farm bureaus of the fifty states. Some of these bureaus are reported to be presently considering the initiation of projects similar to Warren County's, hoping to interest rural people in making an inventory of the health conditions in their own community. Through the federation, the new survey schedules have been made available at state farm bureaus and it is understood that "such offices are eager to cooperate with health groups." The schedules parallel the professionally oriented schedule offered by APHA which is primarily directed toward urban and suburban community studies.

Veterinarian Belongs to the Team

Both a graceful and a useful gesture is the September-October issue of "Commonhealth," the bimonthly publication of the Massachusetts Department of Health. By way of tribute to the 75th anniversary of the state veterinary association this is dedicated "to the mutual efforts of the department and the veterinary profession for the common good." The lead article on "Public Health and Veterinary Medicine," by Health Commissioner Alfred L. Frechette, M.D., reviews the veterinarian contribution to the control of rabies, trichinosis, tuberculosis, and encephalitis, to name but a few. Two other articles by staff members detail the history of meat inspection and of veterinary medicine. The final two pages are devoted to veterinarian James Addison McComb, D.V.M., who is director of the department's biologic laboratories.

Hospital Story: 1758-1958

A good example of keeping your public informed is "Pittsburgh's Fortresses of Health" which is the present-day story of Allegheny County's 28 voluntary, nonprofit community hospitals, as well as the 200-year story of hospital progress in the area. The well produced and handsomely illustrated report is the product of the Hospital Council of Western Pennsylvania, Pittsburgh.

Awareness of One's Problem

"Southeastern Ohio . . . from 'huckleberry knobs'" in a recent "Ohio's Health" is the opening article of a complex analysis of one of the state's regions described as "pretty but poor, its people sage but long-suffering." How this coal mining area of 21 counties was settled, what its industry has been, how it is being rejuvenated by reforestation, recreation facilities, and industry is summarized. The area has a fourth of the state's land area but less than a tenth of its population.

The recent growth in health services is detailed. A five-year increase of 39 per cent in health appropriations is contrasted with a 27 per cent increase for the state. During the last decade the unqualified health departments have decreased from 26 to 14, all but six of them in small cities. Much of this development has been made possible by cooperative action. Twelve of the counties are associated with one or more neighbors in joint administration.

The analysis of health conditions—infant death rate, number of hospital beds, well child conferences, chronic

disease problems, rabies—and what is being done to meet them, might serve as an example to other state health departments seeking to analyze regional needs and resources.

Ohio's Health, September-October, 1959, 306 Ohio Departments Building, Columbus 15, Ohio.

Community Mental Health References

Community Mental Health: A Selected List of References "is primarily intended for those persons interested in familiarizing themselves with this rapidly developing field." Included are approximately 700 references covering the period, January, 1953-March, 1959.

The references, divided into 12 broad sections, were selected as illustrative examples of divergent approaches and are from readily accessible periodicals. Items were selected because of their particular interest to the post-doctoral program in community mental health at Harvard Medical School—Massachusetts General Hospital. The authors, Sidney Gelfand, Ph.D., and James G. Kelly, Ph.D., prepared the list while they were research fellows in the program. A final basis for inclusion of references was "a subjective estimate (by the authors) of the quality of the reference." Copies from John M. von Felsinger, Ph.D., Department of Psychiatry, Massachusetts General Hospital, Boston 14, Mass. 25 cents.

It's Smart Not to Smoke

The Nassau County (N. Y.) Tuberculosis, Heart and Public Health Association, Inc., uses one of its recent "Ideas for Teachers" to give the teacher suitable ammunition in discouraging teenagers from smoking cigarettes. In addition to a factual article on what is presently known about the circumstantial relation between smoking and lung cancer, there are suggestions for discussion among groups of students. Much is made of the psychological reasons for smoking—the need to conform, the desire to be a "big shot" grown-up. An athletic coach says "Smoking and participation in track events . . . do not mix." A physician says, "Smoking appears to me always as a continuation of thumbsucking—an atavistic trait."

Howard E. Roberts is the editor of "Ideas." He indicates an unexpected response to this issue and apparently welcomes more response. 1432 Northern Boulevard, Roslyn, N. Y.

Worth Acquiring

The report of the Surgeon General's Consultant Group on Medical Education is now available. Titled "Physicians for a Growing America," among its conclusions is that "If the current ratio represents a minimum adequate supply, and the Consultant Group's consensus is that this is the case, then the recent rate of growth of medical schools will not provide the nation with adequate numbers of physicians."

There are important findings as to factors that deter students from entering medical education. There is a full discussion of the medical school, its history, its current status including financing and the problems of expanding present facilities. An appendix discusses the need for an increased supply of dentists.

Public Health Service Publication No. 709, Government Printing Office, Washington 25, D. C.; 60 cents

"The Role of Nutrition Education in Combatting Food Fads" includes the papers given at "a symposium on nutrition research and education," with emphasis on food fads and quackery, held in Berkeley, Calif., January 15, 1959. Sponsored jointly by the Nutrition Foundation and the Northern California Section of the Institute of Food Technologists, the pamphlet details some of

the food fads and quackeries and the illogic back of them. It should be a good tool in the hands of the nutritionist involved in consumer education.

The Nutrition Foundation, 99 Park Avenue, New York 16, N. Y.; free.

The American Journal of Nursing for December contains a special section, "An Annotated Bibliography: Staphylococcal Infections" by Mary R. Lester, R.N., M.P.H., chief, Nursing Section, Epidemiology Branch, USPHS, Communicable Disease Center. The bibliography is now available as a reprint. This 21-page work is in ten sections: the organism, epidemiology, the obstetric unit, the operating room, the surgical unit, the medical unit, the community, prevention and control, general, and films. Where appropriate the compiler has given brief and informative descriptions of contents or other interesting features of the references. Reprint Department, American Journal of Nursing, 10 Columbus Circle, New York 19, N. Y.; 25 cents.

Annual Reports

"3-Point Attack on Tb!" is the 1959 annual report of the National Tuberculosis Association. The three points are illustrated on the cover as detection, treatment, and research.

The problem is underlined in the opening page with a few graphic facts: one out of every four persons now infected with Tb germs; a new case of Tb every six minutes; one of every 90 persons with active Tb or a past history; and one Tb death every 45 minutes.

A beautifully produced report with excellent illustrations. National Tuberculosis Association, 1790 Broadway, New York 19, N. Y.

"Public Health, Detroit, 1958" is a large volume partly because it has a lot to tell its clientele of nearly 2,000,000 beings. But the type of production is another reason. The job is inexpensively done in typing and offset with large type and generous spacing for easy reading.

Because Detroit was one of the cities with a 1958 polio epidemic, the cover calls attention to a special section in "A Big City Fights Polio." Inside the cover is a census tract map showing the high areas of polio incidence. Thus the annual report in addition to being a report of stewardship is also a tool in the polio immunization campaign.

The health officer of Detroit, and of Wayne County as well, is Joseph G. Molner, M.D., M.P.H., Detroit 1, Mich.

NEWS FROM THE FIELD

WHO News

Regional Committee Meetings

Southeast Asia:

Representatives of nine countries, the UN, FAO, and UNICEF came to Kandy, Ceylon, for the 12th session of the WHO Regional Committee for Southeast Asia in September, 1959. In his report the regional director, Dr. C. Mani, pointed out that the limited resources for public health in the region require that the best possible use be made of them. Some of the problems cited: the number of medical schools and admissions has increased without commensurate increase in staff; doctors and nurses often do clerical, even domestic work; staffs of rural health centers must pay more attention to preventive medicine and health education; costly medical equipment is frequently not properly maintained. However, heroic efforts are being made in Southeast Asia to improve the people's health against tremendous odds and despite economic difficulties.

In the year (August, 1958-July, 1959) being reported WHO helped the region's governments with 130 field projects mostly in communicable disease control, rural health services, and health worker training; 240 field workers staffed these projects. Every country in the region now has a malaria eradication program. All are planning comprehensive smallpox vaccination programs. The committee recommends mass immunization campaigns against whooping cough, diphtheria, tetanus, typhoid fever, and tuberculosis to begin once smallpox is under control; to this end, epidemiological units must be set up in health departments must therefore set up epidemiological units.

Eastern Mediterranean:

Sessions for the 9th meeting of the Regional Committee for the Eastern Mediterranean were held by Subcommittee A in Alexandria, United Arab Republic, and by Subcommittee B in Geneva, both in September. The resolutions of the two subcommittees were in most cases identical. In discussions of the annual report of Dr. A. H. Taba, regional director, the committee expressed satisfaction with the increasing emphasis on education and training, the improved environmental sanitation, and the promotion of all aspects of maternal and child health in the region.

The committee urged that an ongoing evaluation of health activities be part of any national health program. Research particularly on bilharziasis and malaria, and on the health aspects of radiation was deemed essential along with the development of vital and health statistics. The control of smallpox and malaria, the existence of nutritional deficiency as a major problem, and the urgency of adequate waste water disposal in the countries of the region claimed much of the committee's attention.

According to "WHO Chronicle" for December, 1959, Subcommittee B noted the evidence of the endemicity of poliomyelitis in the region, urging member states to make polio vaccination compulsory and to set up systems for reporting and accumulating accurate statistical data on the disease.

World Health Day 1960

April 7 is World Health Day, the anniversary of the day on which the World Health Organization came into being in 1948. The theme for the 1960 observance of the day is "Malaria Eradication—A

World Challenge." This is an appropriate topic in view of the progress that has been made under WHO leadership in freeing millions of people from this scourge.

The Public Health Service will provide groups interested in promoting the day's observance with program materials and background information on WHO, the history and current status of malaria throughout the world, and notes on the progress which has been made in the world-wide malaria eradication effort. Assistant to the Surgeon General for International Health, Public Health Service, Washington 25, D. C.

Nutrition Directors Elect

The Association of State and Territorial Public Health Nutrition Directors has announced the election of its officers for the 1960-1962 period:

President—Frances N. Shoun, M.P.H., director of nutrition, Tennessee Department of Public Health, Nashville

President-Elect—Anne R. Matthews, M.P.H., chief nutritionist, Bureau of Preventive Medicine, Maryland State Department of Health, Baltimore

Secretary-Treasurer—Margaret A. Dunham, director, Division of Nutrition, Indiana State Board of Health, Indianapolis

Executive Committee—Dorothy B. Hacker, nutrition consultant, Division of Maternal and Child Health, New Mexico Health Department, Santa Fe (1959-1963).

Safety Research Award to Be Made

The National Safety Council has announced its new $1,000 Metropolitan Award for Research in Accident Prevention, to be administered under a grant from the Metropolitan Life Insurance Company. The 1960 award will be made for research completed within the three-year period of from 1957 to 1959. Qualifiers must submit their research before April 30, 1960, to John J. Flaherty, director, Research Division, National Safety Council (425 North Michigan Ave., Chicago 11, Ill.), from whom complete information and rules may also be obtained.

Foundation Disbands

The trustees of the Common Cold Foundation voted in December, 1959, to terminate the activities of the foundation. "This step was taken with the greatest reluctance for the primary reason that the trustees felt they were not in a position to secure and maintain an organization to handle the necessary nation-wide fund-raising campaigns in competition with the other large health funds of national scope."

The trustees expressed the hope that another group would be organized on a national basis to add to the "measurable progress made (by the foundation) in advancing the knowledge of the causes of the common cold." Offices were located at 370 Lexington Ave., New York 17, N. Y.

Local Health: West, South, and East

West:

The Utah State Department of Health held a conference of local health officers in November "to acquaint (them) and staff with the programs and policies of the state health department and the things local health departments can do to better carry out their responsibilities." In July the State Department of Health had, as planned, discontinued the direct employment and supervision of local public health staffs. Contracted local services are now under the direction of county or local departments with consultation, inspection, and financial assistance from the state. Each county or local health department was asked to appoint a health officer; by October all but two counties had done so. Although the State Health Department also closed its district offices in July, state-employed nurses and sanitation personnel will work out of seven area offices as consultants.

"Arizona Public Health News" for July-August, 1959, is devoted to local health services in 12 of the state's 14 counties, giving the number of square miles and population in each. The number of public health workers authorized and actually in the different occupational categories in each county is also detailed, along with a brief description of the county's health program. A succinct and informative 24 pages, this issue may be available to interested non-Arizonans.

South:

The Kentucky State Department of Health's Annual Report for 1958-1959 notes progress in the ways and means of supporting local health services. Sixty of the 72 counties with health departments now qualify for the state's Public Health Foundation Program.

This program was begun two years ago, as an incentive for county health departments to increase their appropriations toward more adequate coverage of community health services. The average per capita expenditure in foundation counties for the period was $1.64 in contrast to 99 cents in nonfoundation counties. Counties qualify for foundation program support by raising 1.7 cents for each $100 of the actual property value of the county. One means of doing this is through the establishment of "public health taxing districts." Six counties set up such districts during the year, making a total of 31 counties no longer dependent on special appropriations from local agencies such as fiscal courts and boards of education.

At the close of the fiscal year, 28 health officers were serving in the 72 county health departments. The 1958 General Assembly legalized the appointment of lay persons to boards of health in counties that do not have three physicians. The State Board of Health appointed seven lay persons in such counties during the year.

East:

In December, 1959, New Jersey's State Public Health Council prescribed a set of regulations known as "Recognized Public Health Activities and Minimum Standards of Performance for Local Health Departments." A committee of local health officers assisted the State Health Department over a period of five years in its preparation. The regulations are to take effect April 1, 1961. The purpose of the activities and standards is to assure that essential services of good quality are provided, "not," according to Harry Robinson, M.D., of Union, chairman of the council, "who provides them in a specific municipality." A public hearing on this set of regulations was held in New Jersey in October.

Printed copies of these recognized activities and minimum standards are available through Jesse B. Aronson, M.D., director, Division of Local Health Services, New Jersey State Health Department, Trenton 25.

Local Health: A Three-Year Plan

How community health services, particularly those supported by taxation, can meet the expanding and changing needs of the 1960's, was discussed at the 12th annual meeting of the National Advisory Committee on Local Health Departments. At an all-day session in New York on January 14 about 100 state and local health officers and representatives of national civic, service, professional, and voluntary health agencies hammered out a three-year plan designed to develop some guideposts for local-state-national action in meeting needs. The first phase of this plan calls for a two-year fact-finding period culminating in a national conference of selected responsible leaders in health and public affairs to develop a "charter of community health." This final document was de-

scribed as a "new Emerson report."* As a final phase, one year would be "a period of intense activity looking toward development of community health services along the lines charted by the conference."

Principal speakers were Herman E. Hilleboe, M.D., New York state health commissioner, and at the luncheon, Eli Ginzberg, Ph.D., director of the Conservation of Human Resources Project of the National Manpower Council, and professor of economics at Columbia University. In "Emerging Concepts on Community Health Services," Dr. Hilleboe projected some of the future needs and ways of meeting them, with particular emphasis upon the involvement and cooperation of the entire community in its health planning.

In "Health, Manpower, and the Nation," Dr. Ginzberg warned that the competition for scientific manpower would force new designs for the use of health workers and also the much greater and more effective use of woman-power in health services.

A four-man panel on "Meeting Community Health Needs" was chaired by Berwyn F. Mattison, M.D., executive director of the American Public Health Association. Panelists were Rome A. Betts, executive director of the American Heart Association; William A. Brumfield, Jr., M.D., Westchester County health commissioner; Melvin A. Glasser, executive vice-president of the National Foundation; and George W. Cooley, secretary, Council on Medical Service, American Medical Association, together with discussants from the floor.

At the business meeting, Duncan W. Clark, M.D., chairman, Department of Environmental Medicine and Community Health, State University of New York, Downstate Medical Center, was elected chairman to succeed Howard Ennes, M.P.H., director, Bureau of Public Health, The Equitable Life Assurance Society of the U. S., who had served for the past two years. Vice-chairman is George James, M.D., deputy health commissioner of New York City. Re-elected secretary is Jesse B. Aronson, M.D., director of the Division of Local Health Services, New Jersey State Health Department, who also chaired the morning meetings. A widely representative 18-member executive committee, in addition to the officers, was also elected.

At a later date, proceedings in full or in summary will be available from the committee, which is sponsored by the National Health Council, 1790 Broadway, New York 19.

* Emerson, Haven, M.D. Local Health Units for the Nation, 1945. Commonwealth Fund. The Subcommittee on Local Health Units, American Public Health Association.

New Central Illness Service

The Health Association of Niagara County, Inc., Niagara Falls, N. Y., is planning a new Central Illness Service, similar to the five Chronic Illness Information Centers in Chicago, Cleveland, San Francisco, Milwaukee, and Essex County, N. J. A two-year study of long-term illness and disability in the area revealed a pressing need for the coordination of existing health services. The agency, staffed by a medical social worker and a secretary, will maintain current data on all community facilities and services for long-term care, provide information and referral services to doctors, patients, and others and promote the addition of services as needed.

Connecticut's Plan Carried Forward

Connecticut's Commissioner of Health Franklin M. Foote, M.D., Dr.P.H., has appointed three deputy commissioners in a reorganization of the State Health Department's program.

Harold S. Barrett, M.D., M.P.H., is now deputy-commissioner, Office of Public Health, which includes five major

divisions: Community Health Services (Martha L. Clifford, M.D., M.P.H., director), Medical Services (Alexander J. Tutles, M.D., M.P.H., director), Preventable Diseases (James C. Hart, M.D., M.P.H., director), Sanitary Engineering (Warren J. Scott, director), and Laboratory Services (Earle K. Borman, director).

Paul S. Phelps, M.D., is deputy commissioner, Office of Tuberculosis Control, Hospital Care and Rehabilitation.

Bert W. Schmickel, former superintendent, Southbury Training School, is acting deputy commissioner, Office of Mental Retardation.

Curriculum and Buildings Grow

University of Michigan's School of Public Health has built and moved into the two new four-story wings added to its original building, thus doubling its teaching and research facilities. The PHS and the Kellogg Foundation supplied the building funds. Each of the school's five departments — environmental health, epidemiology, industrial health, public health practice, and public health statistics — has benefited. The National Sanitation Foundation is also in the building.

In the fall semester of 1960 the school's Bureau of Public Health Economics is going into a new program of graduate training for research in medical care with Ford Foundation support. The curriculum is to relate to the bureau's research program on the social factors associated with the provision of health services for the aged.

NHC Now Has 70 Members

The National Health Council has voted three more national organizations into its membership: The American Nursing Home Association, the Blue Cross Association, and the Society of Public Health Educators. The council now totals 70 national organizations, representing the principal voluntary, professional and governmental health agencies, and selected business and civic groups concerned with health improvement of the nation. Other additions to the membership of the council during 1959 included Chas. Pfizer & Co., the American Psychiatric Association, and the American Hospital Association.

The NHC believes that the accelerated increase in membership in recent years shows "evidence of the desire, and willingness, of the nation's major health interests to cooperate in the common cause of health advancement."

Training in Epidemiology

A course in "Applied Epidemiology" will be offered at the Communicable Disease Center, Atlanta, May 9-13, 1960, for physicians who serve as investigators of disease outbreaks or have administrative responsibility for such investigations. Students will be helped to an understanding of how epidemiological technics (especially in group settings) can be used in solving problems in the preventable disease field.

Information and applications from: chief, Communicable Disease Center, Public Health Service, 50 Seventh Street, N.E., Atlanta 23, Ga. Attention: Chief, Training Branch.

Evidence on Fluoridation Mounts

Milwaukee's water has been fluoridated for six years. In October, 1959, the Health Department conducted a dental survey of 4,660 of the city's school children. Tabulations were made in the amount of reduction in dental decay in first and permanent teeth and in six-year molars. Virginia Downs, M.D., M.P.H., superintendent, Bureau of Maternal and Child Health, Milwaukee Health Department, and William E. Schultz, D.D.S., director of the bureau's Dental Division,

directed the survey and report that the reductions were highly significant. Examples: the per cent of children with caries-free six-year-old molars increased from 20.4 per cent in 1950 (antefluoridation) to 39.4 per cent in 1959; differences in dental caries prevalence in permanent teeth from age six through 14 reached as high as 59 per cent in the seven-year-olds. As is the usual case, the relatively low cost of fluoridation (5½ cents per capita over the six-year period) has paid off in substantially better dental health for the community.

Incidental intelligence: Hartford (Conn.) was able to observe Children's Dental Health Week (February 7-13) this year with a significant advance in community health to its credit. The Hartford Health Bulletin for January reported in an article entitled "Nine Years and 72,000 Children Later!" that the Hartford area began receiving the benefits of a fluoridated public water supply in January. This is considered a signal victory in view of the strong opposition the measure has faced. Now over one in five Connecticut residents have fluoridated water.

Health Education Program Honored

A cooperative health education program in San Diego (Calif.), in which the city's health department aided the city's Association of Life Underwriters, has netted honors for the latter: the Public Service Award of the National Association of Life Underwriters and the Institute of Life Insurance for a life underwriters association numbering between 101 and 400 members. The award, in the form of a plaque with bronze medallion, for outstanding community health and welfare services was presented to the San Diego group at a banquet in November by Louis I. Dublin, Ph.D., health and welfare consultant to the Institute of Life Insurance, and coordinator of the nation-wide award program. Dr. Dublin was APHA's 1959 Sedgwick Memorial Medalist.

The underwriters dealt with five health topics, devoting a two-month period to each in their educational program: Salk vaccination, sanitation, safety, general health (heart, cancer, tuberculosis), and rabies. Health department personnel instructed the life underwriters in ways to introduce a chosen health topic during calls on their clients and prospects, and supplied them with pamphlets for distribution furnished by the department and five related voluntary organizations. During the year the agents carried the program into over 2,000 homes, encouraging families to take some appropriate action, such as starting or completing a Salk vaccine series. The program was periodically evaluated by the agents and the health department. The San Diego association intends to continue "a public service program in health or areas related to health."

The awards are made annually to life underwriters associations in the large, medium-size, and small classes. The 1958 award in the 101-400 class was to the Minneapolis association for its activities in that city's heart fund campaign. In 1959's 50-100 class, the Huntington, W. Va., association received a plaque for an outstanding polio immunization education program.

A mimeographed report of how the San Diego Department of Public Health cooperated may be available through Marion T. Bryant, chief of the department's Bureau of Public Health Education, Civic Center, San Diego 1, Calif.

Five-Year Alcoholism Study

The North American Association on Alcoholism Programs is sponsoring a five-year study of alcoholism in the United States and Canada. Among its tasks are review and evaluation of existing literature; study of such machinery

of control, discipline, and treatment as public health agencies, courts, and clinics; definitions of the obstacles to effective action; and a study of the supply and demand of workers needed for an attack on the alcoholism problem. An independent Cooperative Commission on Study of Alcoholism will carry out this project, supported by a grant from the Public Health Service. The North American Association is made up of the directors of tax-supported state alcoholism control programs.

PERSONALS

PAUL C. BEAVER, Ph.D.,† Vincent professor of tropical diseases and hygiene, Tulane University Medical School, New Orleans, is new editor of the American Society of Tropical Medicine and Hygiene.

HARVE J. CARLSON, D.P.H., former head, Microbiology Branch, Office of Naval Research, is now program director for Biological Facilities, Division of Biological and Medical Sciences, National Science Foundation, Washington, D. C.

PAUL J. CARDINAL,† vice-president in charge of industrial relations and assistant secretary, Hoffmann-LaRoche Inc., has been elected treasurer, National Vitamin Foundation, succeeding J. David Hayden, who has resigned.

HERALD R. COX, Sc.D.,* director of virus research, Lederle Laboratories Division, American Cyanamid Company, will become president, Society of American Bacteriologists, in July, 1960. JOHN E. BLAIR, Ph.D.,† head, Department of Bacteriology, Hospital for Joint Diseases, New York City, is vice-president.

JAMES O. CULVER, M.D., M.P.H.,† formerly medical officer, Viral and Rickettsial Disease Laboratory, California State Department of Health, is now assistant professor of preventive medicine, University of Vermont, College of Medicine, Burlington.

JOHN D. FAULKNER,* sanitary engineer officer and chief, Milk and Food Branch, PHS, Washington, D. C., was presented with the annual "Citation Award" at the 46th annual meeting of the Association of Milk and Food Sanitarians.

MORRIS FISHBEIN, M.D.,* delivered the Tenth Annual Schwitalla Lecture on Hospital Administration of St. Louis University, St. Louis, Mo., January 13.

LEON L. GARDNER, M.D., M.P.H.,† for nine years chief, Division of Preventive Medicine and, during 1959, chief, Bureau of Acute Communicable Disease Control, in the San Diego (Calif.) Department of Public Health, has resigned for health reasons.

I. H. GOLDBERGER, M.D.,* director of health education emeritus, Board of Education, New York City, and clinical professor of pediatrics, New York University School of Medicine, was guest of honor at the thirtieth anniversary dinner tendered by the Medical Board of the Morrisania City Hospital, of which he was a founder.

LEONARD GREENBURG, M.D.,* formerly commissioner, Department of Air Pollution Control, New York City, is now professor and acting chairman, Department of Preventive Medicine, Albert Einstein College of Medicine, New York City.

MILTON GROSS, Ph.D.,* director, Department of Biochemistry, Margaret Hague Maternity Hospital, Jersey City, N. J., has received the 1959 Squibb Prize, awarded each year at the annual meeting of the Pacific Coast Fertility Society.

A. Z. HAMBURG, M.P.H.,† former assistant administrator, Mount Sinai Hospital, Minneapolis, Minn., is now administrator, Jewish Hospital of Hope, Montreal, Canada.

ELIZABETH M. HATFIELD, M.P.H., former statistical consultant, Virginia Tuberculosis Association, and former supervisor of statistical analysis and reports, North Carolina State Board of Health, is now director of statistics, National Society for the Prevention of Blindness.

MOSES A. HAYNES, M.D., former medical officer in charge, PHS, Indian Hospital, Cheyenne Agency, S. D., is now assistant professor of preventive medicine, University of Vermont College of Medicine, Burlington.

FRANK L. HORSFALL, JR., M.D.,† now vice-president, Rockefeller Institute, will become president and director, Sloan-Kettering Institute for Cancer Research, in the spring of 1960.

HOWARD E. HOUGH, M.P.H.,* former head, Bureau of Health Education, Illinois Department of Public Health, is now secretary of the Paper Cup and Container Institute's Public Health Committee.

WILLIAM T. INGRAM, M.P.H.,* consulting engineer, with offices at 20 Point Crescent, Whitestone 57, N. Y., has opened a West Coast office at 90 Panoramic Way, Walnut Creek, Calif., with FRED R. INGRAM* as associate in charge.

* Fellow.
† Member.

BASIL C. MACLEAN, M.D., M.P.H.,* retiring president of the Blue Cross Association, is now a hospital consultant, with offices at 36 Sutton Place South, New York, N. Y.

L. D. MATTER,† formerly chief engineer, Water Supply Section, Pennsylvania Department of Health, has joined the staff of Albright & Friel, Inc., Philadelphia, Pa.

ANTHONY A. MIRA, M.D.,* for the past three years director, Bureau of Industrial Health and Workmen's Compensation of the Medical Society of the State of New York, is now medical director, General Telephone Company of California, with offices in Santa Monica.

ROBERT L. NOLAN, M.D.,† has been appointed assistant chief of pediatrics, Permanente Medical Group, Kaiser Foundation Hospital, Oakland, Calif., where he is in charge of outpatient pediatric services.

SOL PINCUS,* consulting sanitary engineer, has moved his office from New York City to P. O. Box 43, Fishkill, N. Y.

PETER ROGATZ, M.D., M.P.H.,* formerly associate director, Hospital and Health Agencies Study for the Federation of Jewish Philanthropies of New York, has been appointed associate director, Montefiore Hospital, N. Y.

FRED B. ROGERS, M.D., M.P.H.,* associate professor of preventive medicine, Temple University School of Medicine, Philadelphia, has been elected president, Alumni Association of Columbia University School of Public Health and Administrative Medicine for 1960-1961.

HERBERT RUBINSTEIN,† formerly executive director, Pennsylvania Health Council, Inc., Harrisburg, Pa., is now assistant director, Michigan Welfare League, Lansing.

JAMES H. STERNER, M.D.,* medical director, Eastman Kodak Company, Rochester, N. Y., was elected president of the American College of Preventive Medicine at its 1959 meeting in Atlantic City. JOHN D. PORTERFIELD, M.D.,* Deputy Surgeon General, PHS, is president-elect.

WILLIAM R. STINGER, M.D., M.P.H.,* former director of services, Crippled Children's Commission (Fla.), has been appointed assistant director, Dade County Health Department, Miami. He is currently president, Florida Academy of Preventive Medicine.

C. J. VAN SLYKE, M.D.,† deputy director, National Institutes of Health, has retired after some thirty years' service in the Public Health Service Commissioned Corps.

JOHN L. WALLACE, former director of fund raising for the New York State Heart Assembly, Inc., is now national development director, National Society for the Prevention of Blindness, New York City.

COLONEL DON S. WENGER, USAF, MC, former deputy commander and chief, Department of Surgery, USAF Hospital, Lackland, Tex., is now chief professional consultant to the Surgeon General, USAF.

LIEUTENANT COLONEL DOROTHY N. ZELLER, former deputy chief, is now chief, U. S. Air Force Nurse Corps, succeeding COLONEL FRANCES I. LAY, who has been named command nurse for the U. S. Air Forces in Europe, Wiesbaden, Germany.

DEATHS

RUSSELL J. CALLANDER, M.D.,† of Solano Beach, Calif., on September 12, 1959 (Occupational Health Section).

GEORGE M. EISENBERG, Sc.D.,* of Philadelphia, Pa. (Laboratory Section).

WILLIAM P. FORREST, M.D., D.P.H.,* formerly special consultant to the regional director, WHO, Geneva, Switzerland and a native of Ayrshire, Scotland, on August 13, 1959 (Unaffiliated).

ORION R. GREGG, M.D., formerly director, Cleveland (Ohio) County Health Department who retired in 1958 (Health Officers Section).

ANGELO M. PERRI, M.D., M.P.H.,* chief, Communicable Disease Center, Philadelphia Department of Health, Pa., on September 18, 1959 (Health Officers Section).

DR. BORIS PLISKIN,† medical director of Malben, Services of the American Joint Distribution Committee, Tel Aviv, Israel, on May 18, 1959 (Medical Care Section).

KENNETH L. SENIOR,† professor and chairman, Department of Biochemistry, Philadelphia, Pa., College and Hospital of Osteopathy, on September 22, 1959 (Laboratory Section).

HENRY W. STEVENS,† business manager, National Tuberculosis Association, New York, N. Y., on January 4 (Public Health Education Section).

BENJAMIN TAPPAN, M.D.,† medical director, Babies Milk Fund Association of Baltimore, Md., on November 30, 1959 (Maternal and Child Health Section).

LOUISE K. TOOKER, R.N., superintendent of the Bureau of Public Health Nursing, Cincinnati (Ohio) Health Department, until she retired in 1950, on November 6, 1959.

* Fellow.
† Member.

CONFERENCES AND DATES

American Public Health Association. Eighty-Eighth Annual Meeting, San Francisco, Calif. October 31–November 4.

Eighty-Ninth Annual Meeting, Detroit, Mich. November 13–17, 1961.

State and Regional Public Health Meetings—March, April, and May:

Alabama Public Health Association. Thomas Jefferson Hotel, Birmingham. March 23–25.

Arizona Public Health Association. Arizona Ambassador Hotel, Phoenix. April 20–22.

Colorado Public Health Association with Western Branch, APHA. Shirley-Savoy Hotel, Denver. May 25–28.

Georgia Public Health Association. De-Soto Hotel, Savannah. May 16–18.

Idaho Public Health Association. Bannock Hotel, Pocatello. April 29–30.

Illinois Public Health Association. St. Nicholas Hotel, Springfield. April 21–22.

Indiana Public Health Association with Middle States Public Health Association. Hotel Severin, Indianapolis. April 27–29.

Iowa Public Health Association. Fort Des Moines Hotel, Des Moines. April 11–12.

Kansas Public Health Association. Broadview Hotel, Wichita. April 18–20.

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Middle States Public Health Association with Indiana Public Health Association. Hotel Severin, Indianapolis, Ind. April 27–29.

Missouri Public Health Association. Hotel Governor, Jefferson City. May 9–11.

Montana Public Health Association. Eastern Montana College of Education, Billings. April 13–14.

New Mexico Public Health Association. La Fonda Hotel, Santa Fe. April 20–22.

New York State Public Health Association. Hotel New Yorker. New York City. May 23–27.

North Dakota Public Health Association. Hotel Gardner, Fargo. May 16–17.

Ohio Public Health Association. Neil House, Columbus. May 26–27.

Oklahoma Public Health Association. Biltmore Hotel, Oklahoma City. March 9–11.

South Carolina Public Health Association. Ocean Forest Hotel, Myrtle Beach. May 12–14.

Southern Branch, APHA. Peabody Hotel, Memphis, Tenn. April 13–15.

United States-Mexico Border Public Health Association. Hermosillo, Sonora. April 4–8.

Utah Public Health Association. Union Bldg., University of Utah, Salt Lake City. April 25–26.

Virginia Public Health Association. Hotel Roanoke, Roanoke. May 16.

West Virginia Public Health Association. West Virginia Hotel, Bluefield. May 12–13.

Western Branch, APHA with Colorado Public Health Association. Shirley-Savoy Hotel, Denver, Colo. May 24–26.

Meetings of Other Organizations:

American Academy of Pediatrics. Atlantic City, N. J. April 20–22.

American Association of Industrial Nurses—Industrial Health Conference. Rochester, N. Y. April 26–28.

American Camping Association—Biennial. San Francisco, Calif. March 2–5.

American College of Nurse-Midwifery. Sheraton-Park Hotel, Washington, D. C. May 6–7.

American Hearing Society. Statler Hotel, Detroit, Mich. May 24–27.

American National Red Cross. Kansas City Auditorium. Kansas City, Mo. May 16–18.

American Nurses' Association. Biennial. Miami Beach, Fla. May 2–6.

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American Social Health Association. New York, N. Y. May 9.

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American Water Works Association. Bal Harbour, Fla. May 15–20.

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National Health Council. National Health Forum and 40th Annual Meeting. Miami, Fla. March 13–18.

National Multiple Sclerosis Society. New York, N. Y. March 21.

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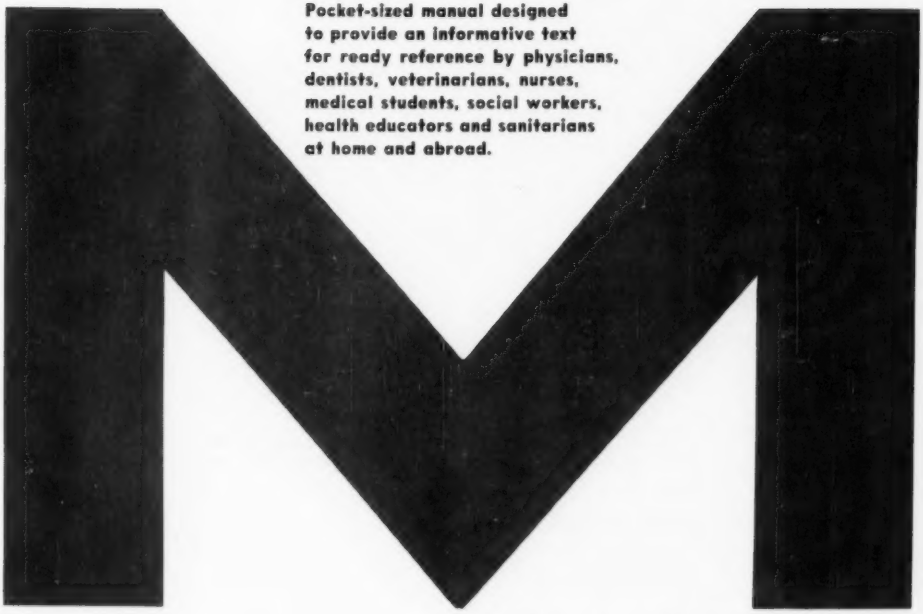

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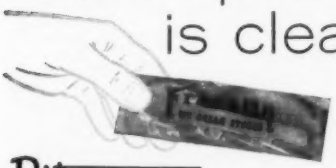

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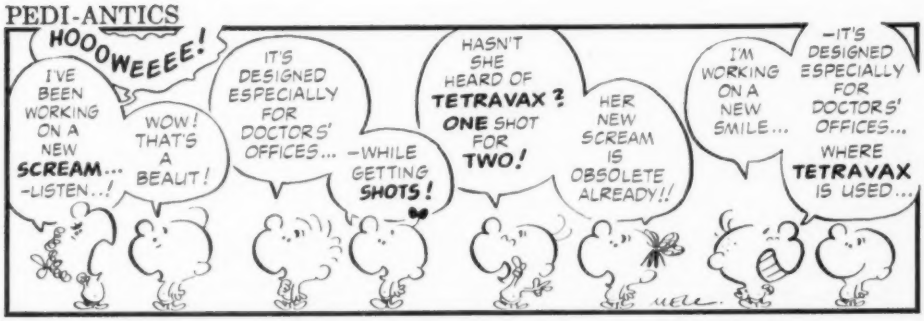
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PREVENTION AND CONTROL OF HEART DISEASE

A Symposium

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These papers were presented before the Association Symposium at the Eighty-Seventh Annual Meeting in Atlantic City, N. J., October 23, 1959.

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HEREDITY AND HEART DISEASE

Jan A. Böök, M.D., Ph.D.

IT IS AN OLD OBSERVATION that there are as many diseases as there are patients. This is true not only in the sense that different individuals react differently to the same etiological agent but also in the sense that most etiological agents are themselves subjected to biological variation. The result is a pathological diversity much greater than is generally appreciated.

Some of the variables which cause individual differences in health and disease are genetic, others are environmental or cultural. For groups of people, i.e., populations, the causes of variation can be broken down into several component parts. This operation can be made in such a way as to make possible an estimate of the relative influence of each of these parts. The genetic components may be polygenic, i.e., due to many genes which combine freely and give continuous distributions. Examples are the genetic components of stature and very likely those of resistance against such infectious diseases as tuberculosis and poliomyelitis. While this type of genetic variation is more significant from an epidemiological viewpoint, the clear-cut major or single gene differences will also often concern the clinician directly. In the latter case we observe discontinuous distributions, in families and in populations.

We define genetic diseases as those in which specific genes are instrumental in the etiology. One of the objects of medical genetics is to identify specific clinical and genetic entities. Other objects of study are the mechanisms by which "abnormal" genes, i.e., mutations, originate and how such mutations spread or disappear in the population. The epidemiology of genetic diseases is becoming a field of growing concern in all countries in which mortality and morbidity due to infectious diseases and nutritional deficiencies can be kept at a low level.

From the clinical point of view the study of the effect of specific gene mutations in the individual patient is quite important. As the effects of a gene are primarily of a biochemical nature, all genetic diseases could rightly be called metabolic defects. However, the pathways from the original intracellular metabolic defects to the symptoms and signs which can be observed by the clinician or with the elaborated technics of the laboratory scientist are many and complex.

Polygenic variation in man can be demonstrated by biometric analyses only for populations, not for single individuals. The proof of single gene causation, on the other hand, will rest on the demonstration of a perfect agreement with Mendelian ratios. The distinction between proofs and explanations in terms of single gene differences is important. Many clinical conditions have been explained in such terms with the aid of additional hypotheses invented to substitute for disagreements with expected distributions. Among the many pitfalls in this context, I should like to mention two very relevant ones.

There is hardly ever a one-to-one relationship between a genetic factor and a clinical or pathological condition. As a rule, given a specific genetic factor (i.e., a mutation), the corresponding pathological condition will appear with varying severity in different in-

dividuals, but occasionally not at all. The possibility of a crucial genetic test, therefore, will depend on the precision with which an indirect diagnosis of the genetic factor can be made. As an example, take the genetic variations in hemoglobin synthesis. No genetic analyses could be based on routine hemoglobin values. It is useful to remember that when one applies the methods of genetic statistical analysis to conditions like congenital heart malformations, hypertension, rheumatic lesions, and so forth, one cannot be sure of being much better off than in applying the same methods to completely undefined conditions as, e.g., headaches or fever. The approach, nevertheless, is quite legitimate as long as the limitations are realized.

The second point is that while it is sometimes possible for the geneticist to prove his case beyond reasonable doubt, a perfect agreement with Mendelian ratios does not exclude a genetic heterogeneity, inasmuch as different genes or alleles may be involved in different families.

It has seemed important to devote a substantial part of my presentation to these introductory remarks because comparatively little research has been made concerning the genetic variables in cardiovascular diseases. Furthermore, the information now available in this respect is rather difficult to explain in simple genetic terms.

I prefer also to restrict my examples to the particular fields with which I have had some personal experience, namely congenital malformations and the relation between hyperlipemia and cardiovascular disease.

Congenital Heart Disease

Congenital malformations of the heart and the large vessels represent a very heterogeneous group of conditions in morphological as well as etiological terms. As in other congenital malformations the main groups of causes are: (1) influences acting through the mother; (2) genetic influences (genotype of the fetus); and (3) interactions of genetic and environmental origin between mother and fetus.

The first studies in which "congenital heart disorder" was treated as a statistical entity have provided little support for the hypothesis that a substantial part of the variation is due to major gene differences. The frequency of congenital heart malformations among newborns appears to be about two per 1,000. However, considerably different figures have been reported, e.g., four per 1,000 in a large series from Boston (cf. Böök and Fraccaro, 1956, MacMahon, et al., 1953). Such differences may be due to genetic as well as environmental factors, but they are often due to different types of registration, interests, and diagnostic precision.

Significant family investigations have been carried out by Polani and Campbell, 1954; McKeown, et al., 1953; and Lamy, et al., 1957. Altogether these studies cover nearly 2,000 families. The incidence of cardiac malformations among siblings falls within the limits of from 1.4 to 1.8 per cent. While these data are useful as general information about the statistical risk of a repeat, they are too heterogeneous to permit any precise explanations in genetic terms.

A more well defined morphologic condition, i.e., patent ductus arteriosus, has been studied by Record and McKeown, 1953, and by Anderson, 1954. The data from about 300 families show approximately the same risks for siblings (1.4—3.2 per cent) as when the index cases exhibited all types of cardiac malformation. It is felt that not even patent ductus arteriosus should be considered an entity of single etiology.

It is true that the literature contains a fair number of reports on families

with an accumulation of individuals with the same type of heart disorder, e.g., Fallot's tetralogy and patent ductus arteriosus. While it is quite possible that major gene differences are responsible in some of these instances, the scientific value of such observations is small.

In some genetic diseases cardiac malformations occur as part of a syndrome, e.g., in Marfan's disease (cf. McKusick, 1958). Since it has now been shown that mongolism quite likely is caused by trisomy (i.e., the presence of a supernumerary chromosome), the cardiac malformations which are a common feature here, belong to this category (Böök, et al., 1959).

It seems to me that further genetic and statistical analyses will not be rewarding until more is known about the pathogenesis, pathophysiology, and embryology of cardiac malformations. While the significantly higher incidence of cardiac malformations among siblings in the absence of known specific exogenous causes indicates genetic variation, the precise nature of these genetic factors remains obscure. In all research concerning congenital malformations it is also important to remember that those observed at birth might, to an unknown extent, represent occasional survivors of conditions which usually are lethal at an early fetal stage. An increased abortion frequency may indicate such a mechanism, e.g., in anencephaly (Böök and Rayner, 1950), but abortion may also occur very early in the pregnancy and pass unrecognized.

Hyperlipemia and Cardiovascular Disease

Familial hyperlipemia, first described by Bürger and Grütz in 1932, appears to be due to a specific major gene. The heterozygotes are characterized by a delay in the clearing of ingested fat from the plasma, milky serum with elevation of all lipids but mainly of the neutral fats, the appearance of severe atherosclerosis in early adulthood, and sometimes xanthomatosis. The homozygotes usually display hepatosplenomegaly, abdominal crises, milky serum, childhood atherosclerosis, and xanthomatosis (Holt, 1938).

The precise nature of the biochemical lesion is as yet not known. The homozygotes are extremely rare and subjected to practically complete selection. However, one could anticipate that the heterozygotes should be relatively numerous. In a recent study undertaken at our institute in Uppsala (Hirschhorn, et al., 1959), we have estimated their incidence in the average population at from 2 to 3 per cent. Although our data indicate that there is a heterogeneity of causes for the primary elevation of blood triglycerides, the association between a mutation affecting lipid metabolism and, e.g., coronary atherosclerosis is interesting and may prove to demonstrate clinically important principles. In individuals who are heterozygotes for genetic hyperlipemia, the concentration of neutral fats as well as cholesterol in the serum can be reduced significantly by simple dietary measures. It remains to be seen, in our prospective studies, to what extent the "heterozygotes" develop coronary disease or other manifestations of atherosclerosis.

In general when discussing diet and cardiovascular disease it should be important not to forget that in so far as metabolism is concerned people differ genetically as much as in physical traits. It is likely that the present difficulties in interpreting the data on diet and atherosclerosis at least to some extent, is due to the fact that it is assumed, or acted as if assumed, that everybody handles his ingested food in exactly the same way. The example of hyperlipemia shows that this is not the case. For practical preventive measures it is important to know those individuals who

due to their genetic constitution would benefit by special diets and those to whom it would make no difference.

Looking at heredity and heart disease has taken us from congenital malformations to nutrition. What ties these diverse fields and many others together are the fundamental principles of biological variation. The medical geneticist is basically a specialist in genetic research methods as applied to clinical problems. To achieve practical results he must work together with clinical experts. In the field of heredity and heart disease one may hope for much more work of this type.

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NUTRITION AND HEART DISEASE

Jean Mayer, Ph.D., D.Sc.

I FEEL THAT I should preface these remarks with a note of apology: I have not worked, I am not working now, and I do not contemplate working in the near future on heart disease. My interests are first as a potential sufferer. According to the statistics of the World Health Organization, my moving from Paris to Boston and becoming an American has increased my chances of dying of heart disease by a factor of almost seven times. I am also interested as a nutritionist, because there is increasing evidence that nutritional factors are of importance in heart disease. Finally, I am interested as a research worker; while I have not worked on heart disease as such, I have worked on some of the regulations of metabolism, particularly on regulation of food intake and regulation of lipogenesis, and I believe that these subjects are not only factually relevant to the problem of heart disease but may furnish a guide as to possible methods of attack on some of the more vexing aspects, particularly cholesterol metabolism.

Let us start by examining the possible relationship of obesity to heart disease and review the facts; my little pause between "the" and "facts" is meant to convey that facts not only are few in that field, but also are not necessarily in agreement with widespread opinions.

According to some recent speakers and to many of the recent press releases, the association between obesity and coronary heart disease is so striking that it has always been observed by good physicians. It has been said that (making allowance for the fact that coronary heart disease as such is of recent diagnosis) Hippocrates himself had recognized the relationship between something like coronary disease and obesity.

When you look into this, as Keys has done, you find extremely little on the subject of obesity in Hippocrates. Actually, there are only three remarks on this subject in those of his treatises which have survived: one on the infertility of fat women among the Scythians, and two sentences about obesity in "Aphorisms." Aphorism number 35 says: "In all maladies, those who are fat about the belly do best. It is bad to be very thin and wasted there."

This remark is never quoted in lectures on obesity and instead there is very frequent quotation of aphorism number 44 which says: "Sudden death is more common in those who are naturally fat than in those who are lean." So much for the ancient writers.

The evidence of a strong correlation between obesity—or, rather overweight—and heart disease, first noticed by Rogers in 1901, and so well presented by Dublin, Marks, and their collaborators,[1] does not need to be recalled here. One may recall that mortality from all causes in overweight men, is 150 per cent of the normal. In overweight women it is 147 per cent, and the difference is particularly striking for heart disease—142 per cent for men, 175 per cent for women.

The implication usually drawn from these data is that obesity causes heart disease. This is a type of reasoning which is dangerous: if one looks at the same table, one finds that the mortality from tuberculosis among overweight insured men and women is very low—21 and 35 per cent, respectively,

and that suicide is also very significantly lowered—70 per cent, as compared to the normal mortality.

Yet nobody has suggested that overweight as such protected against, say, the infection by tubercle bacillus: It has been shown by a careful English long-term study that the association between overweight and decreased mortality from tuberculosis is not an artifact due to the effect of a wasting disease, but the result of a decreased tuberculosis morbidity among obese individuals.[2]

Similarly, the decreased incidence of suicide among the overweight has never been ascribed seriously to obesity as a causal factor: inability to drag yourself to the window or get through it, or impossibility of getting strong enough rope to hang yourself if you are overweight.

It is obviously more reasonable to assume that there is an association there, that some of the factors that make for obesity also make for decreased tendency to suicide. So I think we should be wary of interpreting too literally such correlation through causation, even though the fact is uncontrovertible that the association is striking in any statistics which involve a large enough number of cases.

Now by contrast, when one looks at reports of smaller and supposedly more careful studies, one finds almost every opinion as regards the possible association of obesity, overweight, and heart disease. For example, in a study of five- and ten-year survival rates at the Mayo clinic conducted on about 6,000 patients, it was found that by and large, the obese patients did better than the normal—70 versus 59 per cent surviving after five years, 44 versus 35 per cent after ten years.[3]

Again this does not necessarily mean that obesity protects against the consequence of angina pectoris; in fact, it could suggest almost the reverse: that obese individuals may be more likely than nonobese subjects to have mild cases (from which they then survive). Again considerable difficulty is encountered in interpreting results.

Results of necropsies are by no means clear either. To give some examples, a study by Rosenthal showed no correlation between atherosclerosis and obesity.[4] A study by Wilens showed a strong correlation between obesity and overweight; and furthermore included the interesting suggestion that a wasting disease or inanition actually decreased the degree of atherosclerosis even when this was already established.[5]

Some of the studies done during the war, particularly in Finland and in the Netherlands, showed a correlation between decreased caloric intake and decreased atherosclerosis.[6,7] Actually, there were many variables other than caloric intake even among nutritional factors (qualitative as well as quantitative changes took place as a result of dietary restriction).

In a study which Wright* conducted in about a thousand patients, there was, if I am not mistaken, very little correlation between weight and myocardial infarction.[8] The study which Keys conducted in his laboratory on a group of about a hundred coronary patients showed no difference in weight distribution from that observed in a hundred similar nondiseased patients.[9]

It has been suggested recently that the correlation between fatness and heart disease is better than that between weight and heart disease. Recent findings on small groups of patients have indeed tended to show that even though there was no difference between the weight of coronary patients and those of normal individuals of the same age, the coronary patients were fatter as detected by calipers. Such studies are, however, difficult to interpret because one of the effects of coronary disease is

* Irving S. Wright, M.D., Cornell University Medical College, New York, N. Y.

probably decreased physical activity and this could account for increased shift from muscle to fat. Considerations of body composition may be also involved in the findings of Breslow on the relatively superior health record of overweight longshoremen.[10]

In a study reported by Wilkins, Roberts, and their collaborators,[11] in the October, 1959, issue of Circulation, there was a strong correlation between weight and atherosclerosis as seen at autopsies. The study done in Framingham by Dawber, Moore, and Mann[12] suggests a definite degree of correlation between overweight and heart disease when the population itself is used to establish its own standards. Initial results indicate that very overweight individuals are more prone to have heart disease than very underweight individuals, with a wide zone in between where it is difficult to observe a correlation. It also appears that the correlation may be more directly one between overweight and hypertension with the effect on heart disease secondary to the occurrence of hypertension.

Generally speaking, I think that it is fair to conclude from these and from many other studies that there is a correlation between overweight and heart disease, but that there are a number of qualifications which must be kept in mind. First of all, overweight appears to be only one of the many contributory factors involved. If the sample is too small or the selection of the experimental group is slanted one way or the other, the correlation may disappear. The correlation is good when one looks at population groups made up largely of very thin people, such as the Bantus or the population of southern Italy—and particularly in populations which have, like these two, very low serum cholesterol.

The correlation is also good if one compares extremely obese with normal individuals. However, between these extremes in weight, unless there is a very large group, such as those described by the insurance companies, or that studied in the United States Army which was made up of 22,000 officers,[13] the effect of obesity is not that definite and may be lost. Therefore, I believe it is a fair conclusion that in very large groups obesity is a factor in heart disease, which justifies weight reduction as a preventive measure, at least for most individuals.

Now if we try to go a little deeper into the problem, and think of possible mechanisms, we encounter the possibility that obesity has a differential effect on atherogenesis and on coronary disaster. For that matter there appears to be a definite difference between the effect of obesity on the coronary artery and the effect of obesity on the aorta. The correlation between obesity and atherosclerosis is much stronger for the coronary artery than it is for the aorta.[11]

We also have the possibility that both obesity and heart disease are linked by association rather than by causation. One possible link is the role of exercise and physical activity. We have shown first in experimental animals and later in man[14-16] (and this has been confirmed by a number of laboratories in other parts of the world) that contrary to general thought (e.g.,[17,18]) — while the increase in physical activities for an already active individual is accompanied by an increase in food intake, a decrease in physical activity below a certain point is not accompanied by a decrease in food intake, and the individual becomes fat instead.

Now, inasmuch as Morris[19,20] in particular, has shown that there may be a strong correlation between lack of physical activity and incidence of heart disease, and there is a strong correlation between lack of physical activity and overweight, we have to acknowledge a possibility that both overweight and heart disease may be in

part due to the same factors, rather than one "causing" the other.

Another possibility is the following: We know about eight or ten different forms of obesity that are present in experimental animals. These have been divided into two classes.[21,22] One we have called regulatory obesities, which are essentially due to a dysfunction in the regulating mechanism—for instance, hypothalamic obesity, or the obesity one can produce by punishing an animal unless it overeats. Such forms of obesity in experimental animals are not accompanied by hypercholesteremia. By contrast, the metabolic obesities occur where a primary metabolic lesion causes the hyperphagia. Examples are the obese-hyperglycemic syndrome, the so-called yellow obesity, and the obesity due to ACTH secreting pituitary tumors. Such obesities show hypercholesterolemia or disorders of cholesterol metabolism as part of the syndrome. Thus it is quite possible that in speaking of "obesity" and "heart disease" and implying that there is one obesity and one heart disease we are using a primitive type of thinking. There are a number of forms of obesity which have various relationships to the many aspects of the disease process.

To give but one last example: in hypothalamic obesity, although there is no effect on cholesterol, prolonged hyperphagia affects the kidneys[23] and a long-term hypertension without any concomitant effect on cholesterol metabolism may be the result of hyperphagia.

Finally, there is the possible interrelationship between genetics and the effect of fat diets in animals. Different types or strains of animals react quite differently to a high-fat diet.[24,25]

The relationship of atherosclerosis and heart disease to nutritional factors other than calories has been discussed in at least three different ways: (1) The possible direct linking of coronary disease to nutrition and particularly to fat intake. (2) The possible linking of nutrition to cholesterol metabolism, leading to a possible relation of cholesterol levels to coronary disease. As Berry has commented about this hypothesis: The first half of the evidence (that leading from nutrition to cholesterol, the "halfway house") is trodden broad and fat, but the second half, the road from cholesterol to heart disease, is as yet poorly blazed. (3) The possibility of a relationship of fat intake either to atheroma or thrombosis as components of coronary disease with emphasis on clotting time; this is supported by claims of increased and more prolonged rise in blood lipoids following ingestion of fat in coronary patients.

The first hypothesis is largely based on surveys. These have been widely discussed, so that we shall not spend much time on them except to recall that Keys found[26] (or thought he had found) a relationship between heart disease and total fat intake. Yudkin[27] found no correlation, working on the same data. Yerushalmy and Hilleboe[28] found that the apparent association decreased if additional countries were considered. Bronte-Stewart found a correlation with the ratio of solid fats to oils, but left out a number of countries.[29] Hollingsworth could find no correlation between the increase in incidence of heart disease in Britain between the pre- and postwar period and changes in fat consumption.[30] Among others, one of the most recent comparisons — that of Jolliffe and Archer[31] is particularly interesting, in that it is more sophisticated and tries to relate death from heart disease not to one component, but to the interaction of various components.

Even if we limit ourselves to experimental studies on human subjects (as distinct from epidemiological studies—or experimental studies in animals), we find ourselves faced with the following collection of conclusions:

Keys suggests that the cholesterol-

lowering ability of certain fats is related to the amount and ratio of the saturated and polyunsaturated fatty acids they contain. The saturated acids raise the serum cholesterol level and are twice as active per gram in raising it as the polyunsaturated or unsaturated acids (which have the opposite effect) are in lowering it. Monounsaturated acids have very little effect.[32]

Ahrens appears to believe that the lowering of serum level is related to the total degree of unsaturation and to the iodine number, presumably with the mono- and polyunsaturated acids all being effective in proportion to their degree of unsaturation.[33]

Kinsell concludes that the polyunsaturated acid (linoleic) is the primary factor.[34]

Bronte-Stewart states that the addition of a saturated oil to a highly unsaturated oil does not necessarily elevate the serum cholesterol level produced by the unsaturated oil.[35]

Beveridge claims that hydrogenation of corn oil, which decreases the unsaturation of this fat, has very little influence on the ability of corn oil to lower the serum cholesterol.[36]

Others have found that by contrast the effect of tung oil in increasing the serum cholesterol level cannot be accounted for by its fatty acid content.

Hegsted thinks he can demonstrate that the product obtained by multiplying the concentration of saturated acids by that of linoleic acid has a high negative correlation with the serum cholesterol levels.[37]

In other words, there is a wide diversity of views, but an almost general acceptance of the idea that by and large saturated acids tend to elevate the level of cholesterol.

There are many other factors which we do not have time to discuss. They have been reviewed recently by Portman.[38] Among others, these are dietary cholesterol, a question which has just been revived by Beveridge[39]; the level and kind of protein in the diet; the very interesting suggestion that purines and pyrimidines may be important in determining serum levels of cholesterol; the possible influence of various carbohydrates: sucrose, lactose, and starch seem to have very different effects on cholesterol levels at least in experimental animals; fiber may be a factor. And then a number of minerals have been involved—vanadium, cobalt, magnesium, calcium, and iron. Vitamins, nicotinic acid, pyridoxine, pantothenic acid, choline, B-21, inositol A, C, and their possible mutual interactions have also been mentioned.

Well, what can we conclude from all this? The thing which strikes me as a physiologist interested in regulations in general is how little has been done on the problem of regulation of blood cholesterol. First of all, is this level regulated by a mechanism insuring its near constancy and reacting to decrease and increase, or is this level just a resultant of various influences, some increasing it, some decreasing it, but none of them subjected to a feedback control? There are very few studies pertaining to that problem. One which deserves to be cited is the interesting work of Siperstein and his colleagues showing how cholesterol inhibits the synthesis of new cholesterol, probably at the mevalonic acid stage.[40] But even that is only a small part of the feedback; and the first step should be to get some idea of the general way in which the regulation works even without knowing the details of the mechanism. Is the regulation of blood cholesterol precise? How long does it take to get back to a given level? How is it effected by general physiological phenomena? And so on. This is the kind of study which has been well done for glucose and which we have tried to do for food intake. It has also been done quite well for blood pH, and for water intake. As far as I know at

present nothing quite like this is being done on blood cholesterol.

It seems to me that animal studies should concentrate on this question because that is what laboratory animals can best be used for—to find fundamental mechanisms. By contrast, laboratory animals are very poor instruments in general to predict small or long-term effects as they may apply to man. This is where human studies are essential and where it would be particularly interesting (even though I realize the difficulties are formidable), to see what the very long-term effects of, say, feeding the various unsaturated fatty acids would be.

From the point of view of treatment, we are, I believe at the point at which diabetes was before the discovery of insulin; and perhaps the only way open to us at present is to recommend a return to the simplest virtues: abstemiousness in diet (low calories, not too much saturated fat, not too much fat for that matter); enough physical activity; if possible, avoidance of unnecessary psychological stress; and I presume that Dr. Hammon will add—less smoking.

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THE ROLE OF HYPERTENSION

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IT HAS BEEN STATED, on good authority, for many years, that hypertension is a symptom only, an insignificant manifestation of an underlying vascular disease which proceeds inexorably regardless of the level of blood pressure. Therefore, reduction of blood pressure, according to these authorities, is not a rational procedure because the vascular damage proceeds nevertheless. Such a nihilistic attitude was quite permissible 20 years ago when there were no effective methods for reducing and controlling hypertension. The whole question was academic anyway, and if physicians could be dissuaded from giving worthless and presumably dangerous medications, so much the better.

Today, however, the situation is considerably different. We now have antihypertensive agents, or combinations of these, which are able to reduce and maintain the blood pressure often into the normotensive range. For example, in a large-scale cooperative study on antihypertensive drugs in the Veterans Administration, the results, as yet unpublished, indicate that a nontoxic combination of available drugs has reduced the average diastolic blood pressure of a large group of mild and moderate hypertensive patients to below 90 millimeters Hg—that is, into the normal range.

This was accomplished without significant discomfort to the patient and by simple rule of thumb methods of dosage and administration. The study, rigidly controlled by double blind placebo technics, leaves no doubt that methods for controlling the blood pressure at least in the less severe cases, have come of age and are available to any physician who cares to use them. This advance makes the question of the significance of the high blood pressure itself assume a new importance. We must seriously seek an answer now as to whether the presence of a high pressure in the arterial tree is of itself harmful or of no consequence. I have tried to find factual evidence for the opinion that the level of blood pressure is of no consequence. I could find very little.

Usually the opinion was expressed without any factual data to support it, or else it was based on a small personal experience of one physician or one small clinic. In the latter, no attempt was made to differentiate between casual and basal blood pressure; and we now know that a fair number of hypertensive patients may be quite labile, exhibiting much higher blood pressures when the doctor records them in his office or in the clinic than at other times. Failure to differentiate these labile patients from the less labile leads to hopeless confusion when one attempts to correlate blood pressure and longevity, particularly if the series is small.

The life insurance companies some years ago compiled their data on the relationship between the level of blood pressure at the time of the initial insurance examination and subsequent life expectancy. This was a cooperative study involving 20 of the largest insurance companies of North America, and it included hundreds of thousands of individuals.

The results of that study show that in regard to systolic blood pressure there is a smooth curve correlation between

the level of systolic blood pressure and the subsequent life expectancy—which, incidentally, pays no attention to the so-called borderline or normality of 140 millimeters of mercury.

With regard to diastolic pressure there also is such a relationship, which proceeds down to about 88 millimeters of mercury. Thereafter the data suggest that patients below that level have a different condition and have a much better life expectancy.

Since hypertension is a slowly progressing disease in most individuals, it is not yet possible to say with finality that reduction of blood pressure with antihypertensive agents prolongs life. It will be five, ten, or even more years before that evidence is in. The previous speaker said we have plenty of time, but I do not think we have so much time.

There is one form of hypertension where the rate of progression is so rapid that even short-term studies under five years can disclose significant differences.

That condition is malignant hypertension. In an untreated series of 146 patients the survival at the end of one year was 20 per cent and at the end of three years was 9 per cent. In our own series of 61 cases of treated hypertension, there was a 65 per cent survival at the end of one year and about 48 per cent at the end of three years. The experience of other investigators, both in this country and in Great Britain, has been similar; namely, that reduction of blood pressure has prolonged life significantly even in this most severe type of hypertension where vascular damage is already far advanced.

Let us turn now to a consideration of the relationship between hypertension and atherosclerosis. The high incidence of strokes due to cerebral atherosclerosis and thrombosis and hemorrhage is so common in hypertensive patients that it needs no further documentation. It is less well appreciated that coronary atherosclerosis and myocardial infarction are more prevalent in the hypertensive than in the normotensive population. In one study of over one thousand cases of myocardial infarction it was found that the incidence of coronary occlusion was five times more common in hypertensive than in normotensive men, and twenty times more common in hypertensive as contrasted to normotensive women. In the carefully evaluated data from the Framingham study, hypertension was found to correlate significantly with the incidence of coronary artery disease.

Obviously some factors are operative in the hypertensive patient which tend to accelerate and promote the development of atherosclerosis. Hypertension may not cause atherosclerosis but it provides a fertile soil for the development of atherosclerosis. This factor, accelerating atherosclerosis, could be the elevation of blood pressure per se, or some other unknown and mysterious factor which operates entirely independently of the blood pressure.

Evidence on this question can be deduced from some interesting experiments of nature. There are certain types of congenital heart disease such as patent ductus arteriosus with right to left shunt, or large interventricular septal defects where the pulmonary arterial pressure more than quadruples its normal value. Occasionally these patients survive to early adult life; and when they do they are commonly found at autopsy to have extensive atherosclerosis not of the systemic arteries, but of the pulmonary arterial tree.

Now, if the hypertension itself is of no consequence, is it not strange that when hypertension exists in the systemic circulation atherosclerosis is accelerated there and spares the pulmonary vessels? But when hypertension is limited to the pulmonary circulation, atherosclerosis develops in the pulmonary arteries but spares the systemic vessels. It seems that one can fit the facts much better by

postulating that it is the elevated blood pressure per se which accelerates the formation of atherosclerotic plaques.

Another critical experiment of nature is exemplified in the hypertension produced by coarctation of the aorta. Here, because of the constriction in the descending thoracic aorta, hypertension is present in the upper half of the body, but below the constriction the blood pressure is usually normal. Thus, if it is the elevation of blood pressure which accelerates atherosclerosis, one would expect to find more plaque formation above the coarctation in the region of elevated blood pressure than below it in the region of normal blood pressure. And indeed there is evidence to substantiate this expectation.

Time does not permit me to go into the large and growing body of evidence which suggests that high blood pressure is bad for all arterial blood vessels, not only in facilitating the development of atherosclerosis, but also of arteriolosclerosis and necrosis. The evidence also is good that hypertension imposes a heavy load on the heart leading first to hypertrophy and then to dilation and failure.

If this indeed be true, that it is the elevation of blood pressure which is the major cause of the cardiovascular damage in hypertension (and my reading of the available evidence indicates more strongly that it is than that it is not), and since reduction of blood pressure can now be readily achieved in most patients, then the problem of blood pressure control has become an important issue in preventive medicine. No antihypertensive drug can dissolve a fibrous and calcified atherosclerotic plaque once it has been formed. The principal value of such drugs is prophylactic.

For this reason it might be well for those interested in public health and preventive medicine to consider seriously the problem of early hypertension, particularly in young and middle-aged adults.

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THE PROBLEM OF ELEVATED BLOOD CHOLESTEROL

Jeremiah Stamler, M.D., F.A.P.H.A.

ATHEROSCLEROSIS is the basic disease process responsible for clinical coronary heart disease. The role of elevated blood cholesterol in the pathogenesis of atherosclerosis is therefore the focal point of this brief presentation. Its basic theses are that serum cholesterol and atherogenesis are interrelated in a very significant way, and that this interrelationship is of great importance for the contemporary practice of clinical medicine and public health.

The evidence supporting this thesis comes from all three basic research methodologies available to modern medicine, i.e., clinical-pathologic research, animal-experimental research, and epidemiologic research.

The origins of our contemporary understanding of this problem go back at least 200 years.* Early necropsy studies in gross pathology yielded the first leads. Thus, Albrecht von Haller in 1755 described aortic atherosclerosis, noting that yellow soft mushy atheromatous material effused between medial and intimal layers. He concluded that a gradual evolution occurred from the soft state of atheroma to a final scarified, calcified, and ossified lesion. The monumental microscopic studies in cellular pathology during the second half of the 19th century, initiated by Virchow and his colleagues, led to the delineation of atherosclerosis as a distinct pathologic entity in the generic group of the arteriosclerоses. This advance stemmed from the recognition and elucidation of the unique morphologic characteristic of the atherosclerotic plaque. It was demonstrated that the mushy, gruel-like material ("athere," Greek for mush)—the hallmark of the lesion—was an accumulation of lipid, including cholesterol. This identification of cholesterol-lipid inevitably posed critical questions: At what state of atherogenesis does deposition of cholesterol-lipid occur? Is this an early, primary event or a late, secondary event? What is the relationship between fat in the diet and lipid in the lesion? All these critical questions had been posed with more or less clarity by the turn of the present century. And several of the early workers, among them Virchow, formulated and adhered to an infiltration theory, i.e., the concept that the atheromatous material is derived by imbibition from the plasma.

In subsequent decades biochemical pathology elaborated these observations and concepts of morphologic pathology. It was demonstrated that atherosclerotic arteries invariably exhibit significant increases in their content of cholesterol and other lipids. Moreover, considerable direct evidence was obtained supporting the infiltration theory, particularly with respect to the derivation of lesion cholesterol from plasma cholesterol.

A second fundamental contribution was made late in the 19th and early in the 20th century by clinical investigation. This research went a step beyond the post-mortem findings of pathology on the problem of the relationship of serum cholesterol to atherogenesis. It was noted that prolonged hypercholesterolemia occurred in a series of diseases, i.e.,

* Many extensive reviews with comprehensive bibliographies on atherosclerosis are available. Therefore, no attempt is made in the present report to present bibliographic documentation. The interested reader is referred to several of these reviews.[1-16]

diabetes mellitus, hypothyroidism, the nephrotic syndrome, essential familial xanthomatosis. Premature severe atherosclerosis was a common finding in patients with these diseases. This generalization closely linked hypercholesterolemia and atherogenesis. It has received firm support from recent studies of these diseases.

A third basic contribution—from the animal experiment laboratory — was made in the period 1908-1912 by Anitschkow and his collaborators. Prior to this time, extensive efforts had been made to reproduce the lesion of human atherosclerosis in laboratory animals—without success. These fruitless attempts, of course, were stimulated by the specific hypotheses of their authors concerning the etiology and pathogenesis of atherosclerosis. Thus, investigators projecting a toxin hypothesis injected animals with toxins; those advancing a mechanical trauma hypothesis traumatized arteries; and so forth. Not unexpectedly, vascular lesions resulted in many of these experiments, but never atherosclerosis.

Anitschkow's breakthrough came in nutritional experiments in rabbits. It was noted that rabbits fed animal tissues developed hyperlipemia and atherosclerosis. Subsequent experiments demonstrated that the atherogenic material in the animal tissues was cholesterol and fat—and not protein.

These studies were vigorously followed up during subsequent decades. In the years since World War II, further major successes have been achieved. By now atherosclerosis has been induced in every experimental animal worked with in the laboratory (omnivorous, carnivorous, herbivorous, avian and mammalian, including primates). Almost without exception, these successes have been achieved by means of a change in diet (with or without other forms of intervention), including an increased intake of cholesterol and fat, leading to a sustained hypercholesterolemic hyperlipemia. This nutritional-metabolic alteration is a virtual sine qua non for experimental atherogenesis.

This generalization from the animal experimental work is of decisive importance for our understanding of the relationship among diet, cholesterolemia, and atherogenesis. Of equal importance is the demonstration that the lesions may regress and even disappear completely in animals, when normal nutrition is restored and hypercholesterolemia reversed.

These findings of experimental atherosclerosis support the concept that elevated serum cholesterol is a key factor in the pathogenesis of atherosclerosis. In addition, they support the concept that habitual dietary patterns may be of great importance in the production of hypercholesterolemia and atherogenesis.

A fourth contribution stems from clinical investigation. It was the demonstration that serum cholesterol levels are elevated in groups of middle-aged men* with clinical coronary heart disease, compared to control groups. Data along these lines began to appear in the early 1920's, and have accumulated in a massive way since World War II. The recent studies show that the younger the two groups, diseased and clinically normal, the greater the differences in serum cholesterol.

It is important to appreciate that these comparisons are not actually between groups of persons with and without atherosclerotic disease; for autopsy studies in Americans clearly demonstrate that coronary atherosclerosis is virtually omnipresent in our adult male population. That is, most of the "normals" among Americans are not truly normal with respect to atherosclerosis, or with respect to cholesterolemia, for that mat-

* A discussion of the sex difference in coronary disease incidence in middle-age, i.e., the relative resistance of woman and susceptibility of men under modern American conditions, is beyond the scope of this report; cf. refs. 3, 6, 8, 12-15.

ter (see below). Most of the "normals" actually belong in the subclinical (or preclinical) submerged portion of the iceberg that is atherosclerotic disease. The comparison therefore is between groups with more and less severe disease. Despite the fact that this is not a "clean" positive-negative comparison, the data are unequivocal. They demonstrate higher cholesterol levels in middle-aged groups with clinical coronary disease, compared with controls. And if the comparison is made between coronary disease groups in the United States and normal groups from many other countries (see below), then the differences are conspicuously greater.

The next major contribution elucidating the relationship between cholesterolemia and atherosclerosis has come from epidemiologic research. Here too, data have been accumulating for a number of decades. The earlier work demonstrated a correlation in populations between habitual dietary patterns and occurrence rates of morphologic atherosclerosis and atherosclerotic disease. In populations habitually subsisting on diets high in animal foodstuffs, including dairy products, the lesion and the disease were invariably common. In contrast, populations with a life-span pattern of diet predominantly vegetarian had low occurrence rates.

This was the correlation indicated by the data available prior to World War II. Since then, the use of the epidemiologic method in atherosclerosis research has been greatly extended. The foregoing correlation has been amply confirmed. Moreover, an additional major correlation has been demonstrated—among habitual diets, plasma cholesterol levels, and atherosclerotic disease occurrence rates. The differences are particularly conspicuous when comparisons are made between middle-aged populations from the United States and from the economically less developed countries of Africa, Asia, and Latin America. Thus, mean serum cholesterol levels of clinically normal middle-aged American men are in the order of 240 mg per cent. In contrast, South African Bantu show mean levels of about 180 mg per cent; Guatemalan handicraft and agricultural workers of about 140 mg per cent; manual laborers in India about 125 mg per cent. The differences in intakes of total calories, total fats, saturated fats, refined carbohydrates and cholesterol, and in occurrence rates of coronary disease in middle-age are correspondingly marked.

Studies on social class differences and on the effects of migration add an additional dimension to these data. Thus, middle and upper class groups in Guatemala and India have mean serum cholesterol levels of about 200 mg per cent, in contrast to the lower levels in manual laborers in these countries. Correspondingly, patterns of diet and disease occurrence in wealthier Guatemalans and Indians tend to approach those of North Americans, rather than those of their poorer fellow countrymen.

Similarly, groups of migrants—Japanese from Japan to Hawaii or the United States, Yemenite Jews from Yemen to Israel, Neapolitans from Naples to Boston, undergo sizable increases in levels of cholesterolemia and in occurrence rates of atherosclerotic disease. These supervene pari passu with changes in mode of living in general and diet in particular. These findings not only lend further weight to the validity—and etiologic implications—of the three-way correlation among diet, serum cholesterol, and atherosclerotic disease. They also strongly indicate that such factors as race, ethnic origin, climate, and geography are of little or no etiologic significance. Thus, the massive epidemiologic data strongly support the concepts that cholesterolemia and atherogenesis in populations are closely related pathogenetically, and that diet is a key etiologic influence on both of these.

Recent epidemiologic studies within the United States have yielded impressive additional evidence on these interrelationships. Thus, differences in serum cholesterol levels in groups of middle-aged American men are associated with marked differences in risk of developing clinical coronary disease. These differences in risk are in the order of 3-6 to 1. The data of the Framingham study, for example, demonstrate an incidence rate of clinical coronary heart disease of 13/1,000/4 years in men aged 45-62 with cholesterol levels under 225 mg per cent. In contrast, the incidence rate was 80/1,000/4 years in the group with cholesterol levels of 260 mg per cent or above. These data, incidentally, serve to illuminate the longstanding problem of proper standards for normal serum cholesterol.

Epidemiologic data of another type add further evidence concerning the relationship between cholesterolemia and atherosclerosis. In our study in a Chicago utility company, middle-aged white males were stratified by such variables as occupation, physical activity of work, white collar vs. blue collar work, indoor vs. outdoor work, sedentary vs. nonsedentary work, education, income. Virtually all groups exhibited similar mean serum cholesterol levels in the order of 240 mg per cent. Prevalence rates for frank hypercholesterolemia — values of 260 mg per cent or greater—were in the order of 300/1,000 for all groups. Prevalence rates of hypertension and obesity were also very similar in all groups, at about the level of 200/1,000. Correspondingly, all socioeconomic groups exhibited high incidence rates of coronary heart disease, in the order of 60/1,000/4 years.

These data lend further weight to the concept that high mean serum cholesterol levels and high prevalence rates of hypercholesterolemia in middle-aged male populations are associated with high occurrence rates of coronary disease.

Data on dietary patterns of different socioeconomic groups in the United States demonstrate a remarkable uniformity, and are correlated with the foregoing findings. Virtually all strata ingest diets high in total calories, total fats, saturated fats, refined carbohydrates, and cholesterol. Recent epidemiologic studies across the country have repeatedly yielded like findings on these matters. Therefore, the three-way correlation — among habitual diet, serum cholesterol and coronary disease—holds for most groups in the American population at midcentury.

Thus far attention in this presentation has been given almost exclusively to the role of hypercholesterolemia, as a single variable, in the pathogenesis of atherosclerotic disease. It has been noted that this one abnormality by itself is associated with a three- to six-fold increase in the risk of clinical coronary disease in middle-aged men. Based on the recent research evidence, it is now possible to go a step further. The previous speaker,* for example, focused on elevated blood pressure as a key variable increasing risk of coronary disease. This is entirely valid. Hypertension too is associated with a three- to six-fold increase in risk. Other abnormalities associated with increased risk of premature coronary disease are: obesity, diabetes mellitus, hypothyroidism, renal damage, heavy smoking, a family history of premature vascular disease, possibly sedentary living, perhaps psychological stress-strain-tension.

The interrelated influences of three of these variables — hypercholesterolemia, hypertension, and obesity—have by now been quantitated fairly precisely. Thus, middle-aged men normal with respect to all three of these had a coronary disease incidence rate of only 10/1,000/4 years, according to the Framingham study;

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the group with two or three abnormalities had a rate of 113/1,000/1 years; a 11-fold difference in risk! Thus the findings of clinical and epidemiologic research have made it quite a simple matter to identify the coronary-prone, high-risk, susceptible persons in our population.

The last major contribution concerning cholesterolemia and atherosclerosis comes from recent clinical research. In the last few years it has been unequivocally shown that hypercholesterolemia can be lowered by nutritional means in most cases. This can be achieved in either of two ways, i.e., by use of diets low in total fats-cholesterol, or by use of oil-containing diets, moderate in total fat content (25-30 per cent of total calories) and low in saturated fats (10 per cent or less of total calories) and cholesterol. Serum cholesterol can usually be reduced by such nutritional regimens without recourse to either pills or jiggers of oil. These diets may also be effectively used for correcting and preventing obesity. Particularly those using oils are palatable, pleasant, and varied. They permit a very delectable cuisine, as well as optimal nutrition. They are readily utilizable and adaptable by ordinary, free-living individuals.

The ability of such diets, made up of mixed ordinary foodstuffs, to achieve reduction of hypercholesterolemia in most free-living subjects has already been well documented in the published reports of Jolliffe, Page, and others, and in the experiences during the last 18 months of our Coronary Prevention Evaluation Program at the Chicago Board of Health. On the average, a 15 to 20 per cent decrease in hypercholesterolemia is readily achieved.

It is worth while, in closing, to speculate concerning the possible significance for public health and preventive medicine of these massive findings on diet, cholesterolemia and atherosclerosis. Consider the following projection: A 15 per cent lowering of the serum cholesterol of middle-aged American men would yield a mean serum cholesterol level of about 204 mg per cent. A 20 per cent reduction would result in a mean level of about 191 mg per cent. The entire distribution curve would shift correspondingly to the left. Instead of a hypercholesterolemia prevalence rate of 300/1,000, it would decline to about 100/1,000 or 45/1,000.

Continuing this speculative projection, the possible effect on incidence rates of premature coronary disease can be estimated hypothetically with quantitative accuracy based on current data. Leaving aside any possible concomitant effects of altered nutritional patterns on other risk factors, e.g., obesity and hypertension, a 15 to 20 per cent reduction in mean serum cholesterol levels alone might be associated with a 25 to 50 per cent reduction in coronary disease incidence rates in middle-aged men.

Coronary heart disease is our major public health problem in the United States today, exacting a terrible toll, not only among the elderly, but as well among the middle-aged. It is truly our Number One epidemic disease at midcentury, as data on incidence and mortality rates clearly demonstrate. As with other epidemic diseases, a principal task of public health and preventive medicine is to identify the susceptibles. This is a first basis for an effective attempt at prophylaxis. Research since World War II has revealed the means for identifying the high risk, coronary prone, susceptible persons before clinical events ensue. They are easy to distinguish, using a series of simple medical determinations—the measurement of weight, blood pressure, serum cholesterol, thyroid function, carbohydrate metabolism; the assessment of kidney status, family history, smoking status, physical activity status.

Except for sex and heredity, all the findings associated with increased risk

of coronary disease are generally amenable to correction and/or control by simple, safe means. Nutrition is a cornerstone of these corrective measures.

The problem remains: How valid is the foregoing speculative projection? How much prevention of coronary disease can be achieved by correction of abnormalities making for susceptibility? Definitive answers to these questions are not yet in, and will probably not be available for five to ten years. However, suggestive information of an encouraging kind is extant.

We are therefore faced with the temporary problem of what to do during this interim period. The elementary data on incidence and mortality rates—considered against the background of the research achievements—seem to compel an unequivocal answer: an incidence rate of 1,000-1,500/100,000/year with from 25 to 30 per cent of first attacks acutely fatal;* a mortality rate of 330/100,000/year in men aged 45-54, with one-third of all deaths in this middle-aged group due to coronary disease. There is no reason to believe that a policy of "watchful waiting"—pending the completion of research studies on prevention during the next decade—will in any way alter this grim picture. On the other hand, the measures proposed for prophylaxis in high risk persons are safe, moderate, sound, and free of danger. And a wealth of evidence points to the likelihood of their value. Their widespread prophylactic utilization by clinical medicine and public health would therefore seem to be the order of the day.

* This fatality rate includes cases dying suddenly and cases not reaching the hospital.

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SMOKING IN RELATION TO HEART DISEASE

E. Cuyler Hammond, Sc.D., F.A.P.H.A.

THE KNOWN ACUTE effects of nicotine on the heart and circulatory system long ago led to suspicion that smoking might have serious consequences in relation to heart disease. Unfortunately, because of the risk involved, this cannot be tested by direct experimentation on human beings. However, during the last twenty years, a great deal of evidence on the subject has been obtained through epidemiological studies. I will first review the epidemiological findings and then give a brief summary of other types of evidence.

In 1938, Pearl[1] presented evidence that the death rate from all causes combined increases with amount of smoking and is very much higher among heavy smokers than among nonsmokers. Two years later, English, Willius, and Berkson[2] reported a positive association between cigarette smoking and coronary artery disease. Specifically, they found a higher percentage of cigarette smokers, particularly heavy smokers, among patients with coronary disease than persons free of this disease. In both studies, the relationship was largely confined to the middle-age groups and tended to disappear in old-age groups.

Within the last nine years, four other groups of investigators have carried out case-control studies of smoking in relation to coronary disease. There were Mills,[3] Gertler and White,[4] Hegglin and Keiser,[5] and Buechley, Drake, and Breslow.[6,7] In all these studies, a higher percentage of cigarette smokers was found among persons with coronary disease than among persons free of this disease.

The early findings from the Framingham study[8] appeared to be contradictory. However, later findings from that study[9] are in essential agreement with the findings reported by all other investigators.

Data are now available from three large-scale prospective studies on smoking in relation to death rates from all causes. Doll and Hill,[10] by means of a mail questionnaire, obtained information on the smoking habits of a large number of British physicians and then ascertained their death rates in subsequent years. Dorn[11] is conducting a similar study of veterans holding United States government life insurance. Hammond and Horn[12] utilized the services of American Cancer Society volunteers to obtain information on the smoking habits of 187,783 white men between the ages of 50 and 69 who were then traced for 44 months; 11,870 deaths occurring among them during that interval of time.

The results of these three prospective studies are in remarkably close agreement with each other. I will therefore not describe them all in detail. I will just give a brief summary of the findings in our study.[12] Figure 1 shows total death

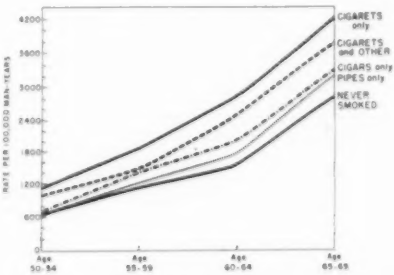

Figure 1—Total Death Rates by Type of Smoking (Life-time History) and by Age at Start of Study

rates by type of smoking for each of four age groups. Note that cigarette smokers had the highest death rates and nonsmokers had the lowest death rates. The death rates for cigar and pipe smokers were only slightly higher than those for nonsmokers. Evidence from another study[13] indicates that most cigarette smokers inhale the smoke moderately or deeply, while cigar and pipe smokers generally inhale the smoke little if at all. This may perhaps account for the observed difference in death rates.

Figure 2 shows mortality ratios for total deaths in relation to amount of cigarette smoking. As a basis for comparison, the death rate of men who never smoked is taken as unity. Note that the mortality ratio increases with amount of cigarette smoking.

Altogether, 7,316 deaths occurred among men with a history of regular cigarette smoking (Figure 3). Only 4,651 deaths would have occurred in this group had the age-specific death rates of cigarette smokers been exactly the same as the age-specific death rates of men who never smoked. The difference of 2,665 deaths may be considered as the number of "excess deaths" associated with cigarette smoking. More than half of these "excess deaths" were attributed to coronary artery disease by the physicians who signed the death certificates.

Figure 4 shows mortality ratios for various circulatory diseases other than heart disease. Deaths attributed to hypertensive diseases showed no association with cigarette smoking and deaths from cerebral vascular lesions showed only a slight relationship to cigarette smoking. Deaths from aortic aneurysm showed a pronounced relationship to smoking habits as did a small group of other circulatory diseases including Buerger's disease.

Mortality ratios for various heart diseases are shown in Figure 5. Coronary artery disease was the only type of heart disease showing a marked association with cigarette smoking.

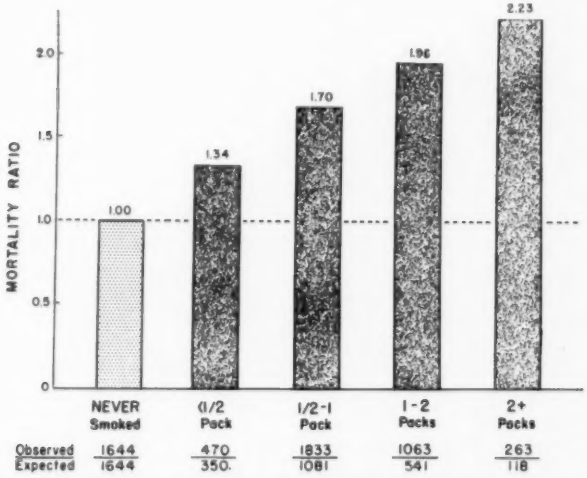

Figure 2—Mortality Ratios for Total Deaths by Current Amount of Cigarette Smoking

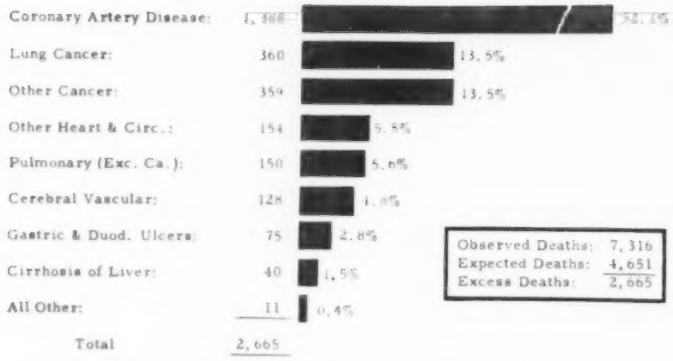
Coronary Artery Disease: 1,868 52.1%
Lung Cancer: 360 13.5%
Other Cancer: 359 13.5%
Other Heart & Circ.: 154 5.8%
Pulmonary (Exc. Ca.): 150 5.6%
Cerebral Vascular: 128 4.8%
Gastric & Duod. Ulcers: 75 2.8%
Cirrhosis of Liver: 40 1.5%
All Other: 11 0.4%
Total 2,665
Observed Deaths: 7,316
Expected Deaths: 4,651
Excess Deaths: 2,665

Figure 3—Excess Deaths Among Men with a History of Regular Cigarette Smoking

The death rate from coronary artery disease increased rapidly with amount of cigarette smoking (Figure 6). The death rate from this disease was nearly two and a half times as high among men who smoked two packs or more of cigarettes a day as among men who never smoked.

Of particular interest is the coronary disease death rate of ex-cigarette smokers as compared with men who continued to smoke cigarettes (Figure 7). Men who stopped smoking less than a year before being enrolled in the study had higher death rates than men who were still smoking cigarettes at the time of enrollment. This is probably due to the fact that some people stop smoking following a heart attack; and the death rate is high among people who have suffered such an attack. The coronary disease death rate of men who had stopped cigarette smoking for a year or longer was lower than the rate for men who continued to smoke cigarettes.

Considering the evidence from such a large number of epidemiological studies of both the retrospective and prospective types, it can hardly be doubted that an association exists between cigarette smoking and coronary artery disease. The question is whether this association reflects a direct causal relationship; and, if so, what mechanisms are involved. For this reason, it is pertinent to give a brief review of other evidence concerning the apparent effects of cigarette smoking.

It has been demonstrated that smoking has the acute effects of producing constriction of the peripheral blood vessels, an increase in blood pressure and an increase in pulse rate.[14] However, it has been found that the blood pressure of cigarette smokers tends to be slightly less than that of nonsmokers.[15] The chronic effects of cigarette smoking on blood pressure and pulse rate are unknown. Possibly the acute effect of an increased blood pressure produced by smoking results in a subsequent decrease in blood pressure. Alternatively, it may be that people with low blood pressure have a greater tendency to smoke than do people with normal or high blood pressure. This point needs clarification.

Carbon monoxide is present in tobacco smoke in sufficient quantities to form several per cent of carboxyhemoglobin in the blood of the smoker.[16] Perhaps this accounts for the experimental finding that cigarette smoking produces both

an immediate and a relatively long-term increase in red blood cell count and in packed cell volume.[17] Conceivably, this might have an influence on the formation of a thrombosis in a damaged blood vessel.

It has been reported that smoking produces marked changes in the electrocardiograms[18] and ballistocardiograms[19] of some patients with coronary artery disease.

Smoking seems to diminish appetite and ex-smokers usually report a gain of weight.[20] This has been directly observed by Brozek and Keys.[21]

Gofman and his associates,[22] Thomas,[23] and Karvonen, Keys, and their associates[15] have reported finding higher average serum-cholesterol values among heavy smokers than among nonsmokers. The latter authors point out that this does not necessarily prove that cigarette smoking causes the serum-cholesterol to rise. It would seem most desirable to test this experimentally.

Preliminary findings from a study I am now conducting indicate that cigarette smokers complain of coughing and of shortness of breath far more frequently than do nonsmokers. There is a great deal of evidence that cigarette smoking has an effect on the lungs.[24] It has been suggested that lung damage from cigarette smoking puts a strain upon the heart and may perhaps increase the case fatality rate of persons suffering from coronary artery disease.[25]

This in brief is the evidence. What does it mean? Certainly, the observed association between cigarette smoking and coronary artery disease must have some rational explanation. The explanation must account for the findings that: (1) cigarette smokers as a group have higher death rates from coronary artery disease than do nonsmokers; (2) the

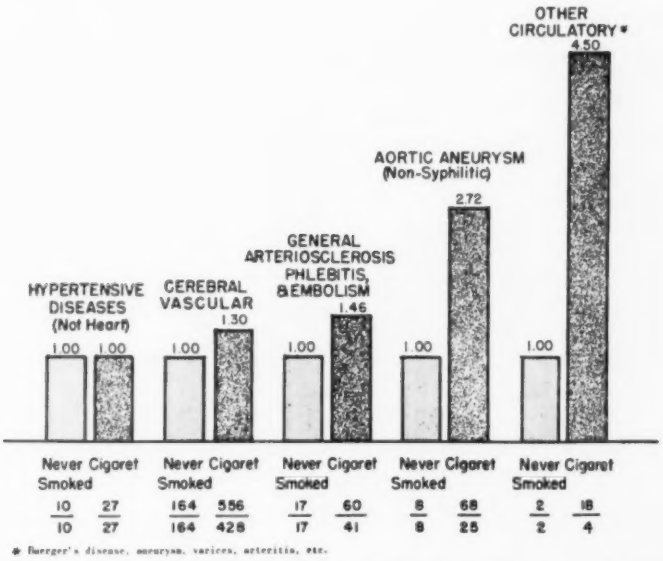

Figure 4—Mortality Ratios for Various Circulatory Diseases other than Heart Diseases

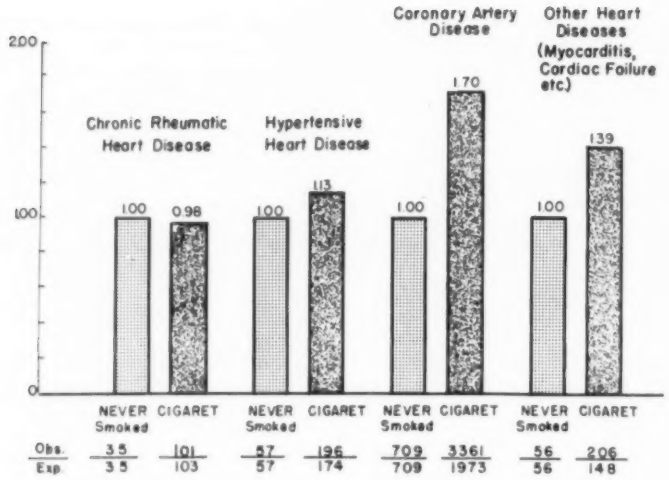

Figure 5—Mortality Ratios for Various Heart Diseases

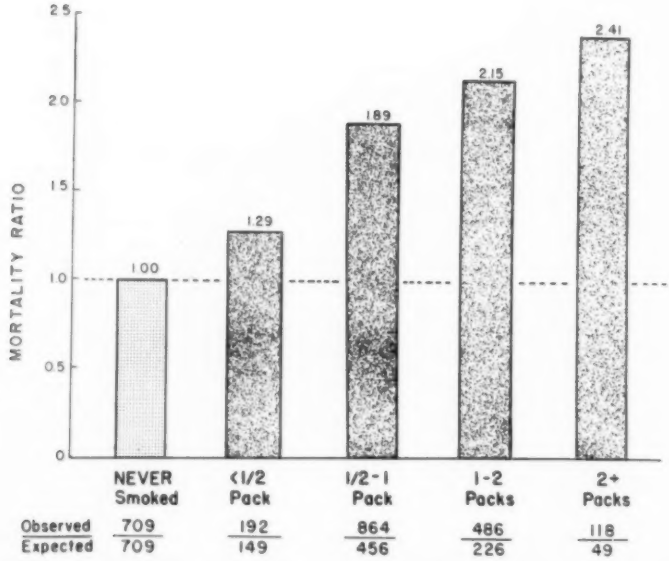

Figure 6—Mortality Ratios for Coronary Artery Disease by Current Amount of Cigarette Smoking

coronary artery disease death rate increases with degree of exposure to cigarette smoke; and (3) among persons who have smoked cigarettes for many years, the death rate is lower for those who have stopped smoking for a year or longer than for those who continue to smoke cigarettes. Personally, I find it hard to escape the conclusion that cigarette smoking increases the death rate from coronary artery disease.

Two alternative hypotheses have been suggested. One is that people with a predisposition to coronary artery disease have a desire to smoke cigarettes; and that the degree of this desire is directly proportional to the degree of predisposition to the disease. Under this hypothesis it would further have to be assumed that some people with a predisposition to coronary disease lose this predisposition; and when they do so they also lose their desire to smoke cigarettes.

The other alternative hypothesis is that cigarette smokers tend to have certain other habits; and that it is these other habits which account for their high death rate from coronary artery disease. It would be rather difficult to disprove this possibility but as yet there is no evidence in support of it. Only an experiment carried out on human beings would provide absolutely conclusive proof as to which of these several hypotheses is correct. However, recent developments may provide us with a means of at least testing the hypothesis that the high nicotine content of cigarette smoke accounts for the high coronary artery disease death rate of cigarette smokers.

The epidemiological studies previously described were carried out at a time when the main stream smoke of almost all American cigarettes contained between two and three milligrams of nicotine, the most popular brands containing about 2.5 milligrams. About a year ago, some brands dropped the nicotine content to slightly over one milligram and these brands became popular. During

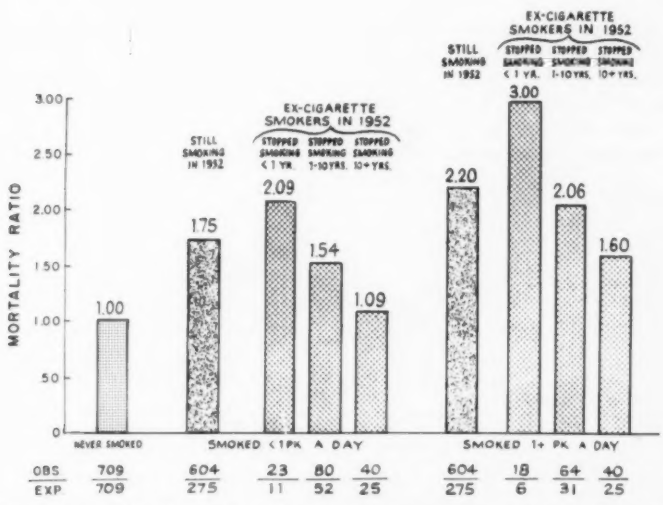

Figure 7—Mortality Ratios, Coronary Artery Disease for Ex-Cigarette Smokers Compared with Men Who Never Smoked and Men Still Smoking in 1952

the last few months several new brands came on the market with less than one milligram of nicotine in the main stream smoke and three of them are reported to have 0.6 milligrams or less.[26] If nicotine is the responsible agent, then heavy smokers who switch to these new brands should have a lower coronary artery disease death rate than those who continue to smoke brands with a high nicotine content. However, this might not be apparent for several years if it should happen that those who change to the new brands are mainly people who have already developed symptoms of heart disease.

I should point out that in addition to nicotine cigarette smoke contains a number of different poisons including carbon monoxide. It may be that carbon monoxide or one of the other components of cigarette smoke rather than nicotine is the responsible agent. If so, then lowering the nicotine content of the smoke would not have the desired effect (unless the responsible agent was also reduced).

Determining the coronary artery disease death rate in relation to nicotine content as well as the daily consumption of cigarettes, should provide excellent evidence on this point. Such evidence may be available in several years from now from a new prospective epidemiological study which we started in the fall of 1959.[27]

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DISCUSSION

Jessie Marmorston, M.D.

I COME FROM THE largest County Hospital in the United States: we have 3,000 beds, and handle approximately 500,000 patient visits per year. In reviewing the death rates due to coronary artery disease at the Los Angeles County Hospital, we find that approximately 70 per cent of our patients are dead within the first 15 months.

I come to this subject via the discipline of endocrinology. During the past six years we have been conducting a study of the relationship between atherosclerosis and the endocrine glands. Several important clinical facts are germane to this discussion. For example, we have been aware for some time that the premenopausal woman—the woman with functioning ovaries—rarely has coronary heart disease. But if she is castrated by x-ray therapy or if her ovaries are surgically removed, chances of coronary heart disease increase markedly. This has suggested that ovarian function and the presence of estrogen may in some way be related to the low incidence of coronary heart disease in the premenopausal woman. Additional evidence of a possible relationship is found when we consider the incidence of heart attacks in the postmenopausal woman, whose production of estrogen is more limited. After the menopause, the incidence of heart attacks increases markedly—almost to the level noted in the male.

Apropos of the experiments I shall report briefly, I should like to mention a fact which I am sure is familiar: both men and women produce male and female hormones in their bodies, although the amounts and proportions differ. And, despite the relatively small amount of female hormone produced by the male, this female hormone is very important to the optimal functioning of the male body. Likewise, the small amount of male hormone produced by the female is very important for the optimal functioning of the body of the female.

In the female, the male hormone is produced primarily by the adrenal glands. After the menopause most of her female hormone, too, is produced by the adrenal. The adrenal gland is of particular interest to persons studying atherosclerosis because it is the "stress gland" of the body. When we began our study six years ago, we tried to gain some insight into possible disturbance of the hormonal picture in the patient with coronary artery disease by measuring hormone excretion levels in the urine. Interestingly enough, we find that the estrogen level in the urine is lower in postmenopausal women who have suffered heart attacks than in similar women of comparable ages who have not suffered heart attacks.

In the more than six years of our study, we have studied the blood lipids and hormonal excretion levels in approximately 1,600 patients. We have studied one series of postmenopausal women for a number of years. This first series is composed of 102 women—51 pairs—who are very closely matched. Within each pair the women are two years or less apart in age and they have had their heart attacks within two years of one another. When the survival of estrogen and nonestrogen members of the pairs are compared, we find that over a period of three years, the estro-

gen-treated members survived approximately 16.3 months longer on the average than the member of the pair who did not receive estrogen. When deaths occurring among estrogen-treated and nontreated members of the pairs are plotted, we find that in the first year, 6 per cent of the estrogen-treated patients died, as compared with 18 per cent of their matched controls. In the second year, the finding is about the same—6 per cent of estrogen-treated patients died, as compared with 14 per cent of their matched controls; and in the third year, 8 per cent of the estrogen-treated died, as compared with 18 per cent of the controls. Thus, at the close of the first 36 months, 20 per cent of estrogen-treated patients have died as compared with 50 per cent of their matched controls who have received no estrogen.

We learn even more about the efficacy of estrogen therapy if we divide these patients into groups depending upon whether or not they have complications —hypertension, failure, diabetes, or myxedema—in addition to their heart attacks. If we consider only patients who have no additional complications, we find that—in the months of our study—the estrogen-treated patients have lived an average of 21 months longer than their controls. Patients with complications, pooled together, lived an average of 14 months longer than their controls. When we consider separately patients with hypertension alone, we find that the estrogen-treated patients lived 16 months longer than their controls; estrogen-treated patients in failure alone lived 14 months longer than their controls; and estrogen-treated patients with diabetes only, fully 29 months longer than their matched controls.

What about patients with a second complication? If we consider all patients—with or without a second complication—we find that estrogen-treated hypertensives have lived approximately 16 months longer than their matched controls; estrogen-treated patients in failure, approximately 10 months longer than their matched controls, and estrogen-treated diabetics, an average of 27 months longer than their matched controls. The advantage throughout our study is consistently in favor of the estrogen-treated.

In some pairs, both members have survived; in some, the estrogen-treated patient; in a few, the control member; and in eight pairs, both members have died. In each pair in which both members have died, the estrogen-treated survived longer than her sister control.

In a second, newer series, we have allocated women patients to estrogen or placebo treatment on the basis of stratified randomization; that is, we have divided them on the basis of age and complication. Using small daily doses of estrogen—only 10 gamma of ethinyl estradiol per day—the results are very similar, thus far, to our findings with our matched group.

We are carrying on a similar experiment in men patients who have had heart attacks. We give our men patients somewhat larger doses of estrogen—50 to 100 gamma ethinyl estradiol, for example, or a comparable amount of either of two other estrogen preparations. Results of estrogen treatment in men patients, soon to be discussed at another scientific meeting, also are encouraging. On the basis of our work thus far, we feel that hormones may play a significant role in atherosclerosis and its complications.

Dr. Marmorston is clinical professor of medicine, University of Southern California School of Medicine, Los Angeles, Calif.

DISCUSSION

D. D. Reid, M.D., D.Sc., M.R.C.P.

FROM THE public health point of view the practical issue seems to be to decide which, if any, of the various theories of causation are soundly based on clinical, laboratory, and epidemiological evidence, and further, which provides the most immediately hopeful way of reducing the risks of heart disease in any given population. Although I am quite incompetent to talk about the clinical and laboratory evidence, there are, I think, some comments that one might usefully make on the epidemiological side.

One of the encouraging aspects of Dr. Böök's paper, for example, is his repudiation of the idea that a demonstration of genetic factors in disease necessarily implies nihilistic defeatism. My Scottish Calvinist background makes it difficult for me to shake off the feeling that predisposition and predestination are all-important and that we must bow to the inevitable. I am therefore grateful to him for the notion that, in epidemiological terms, we should concentrate on identifying our susceptibles and then doing something to protect them.

Perhaps one should also emphasize the essentially selective nature of some of the population groups which have been used in epidemiological studies. Coronary heart disease patients in hospital, for example, are those who have survived the acute attack, and they may differ quite radically from those who died in the acute phase of the disease. To some extent the same sort of criticism applies to experience of those who have been accepted for life insurance. Nevertheless, as Professor Major Greenwood used to say, we should never make the best the enemy of the good and that we want to do the best with the data we have.

Within the limits of this discussion, I can comment only on some of the evidence that comes from international or regional comparisons in the death rates from coronary thrombosis. This was raised early in the discussion where it was pointed out that the most striking facts in international comparison at the present moment is a very high rate of death from ischemic heart disease in the United States, compared with other reasonably similar countries such as Norway and the United Kingdom.

Dr. Fries referred rather obliquely to psychological stresses as a cause of coronary disease. Certainly the stress theory is consistent with the mental stereotype which most Europeans have of the American business executive—dynamic, thrusting, always under stress. But I know America better than this and I believe that here Hollywood has held up a distorting mirror to life in America. In short, I doubt whether this is any real explanation of the American excess in coronary mortality.

Now, there are clearly good reasons for supposing that highly saturated animal fats in the Western dietary may be as dangerous as they are delectable, but before recommending major changes in national habits of diet, some inconsistencies in the epidemiological evidence should at least be recognized. While the report of fall in coronary disease mortality in the occupied countries certainly coincided with a fall in the animal fat content in the national diet, it also coincided with a fall in the supply of cigarettes. The same cycle of events in Denmark during the rationing of the

first world war was strikingly associated with fall in the consumption of spirits during the same period. Then, as Hilleboe and Yerushalmy pointed out recently, there are many exceptions to the general rule that the high proportion of fat in the national diet is associated with a high mortality from ischemic heart disease. Indeed, from a technical point of view the correlation between coronary mortality and total calories per person in the country concerned, is in fact rather higher than that with the proportion of fat. The international pattern in mortality cannot be explained by differences in fat consumption or dietary changes in recent years.

Dietetic changes cannot, for example, explain the upsurge in coronary disease mortality which has been happening in different time periods in the countries of Europe during the last 30 or 40 years. Nor does it explain this excess in male mortality in countries where the death rate in the younger males in particular is much higher than that of women of the same age. Generally speaking, these differences in male:female ratios are less sensitive to international differences in diagnostic habit and it may be significant that both this sex ratio and the male death rate in the countries listed in the WHO reports is highly correlated with cigarette consumption in these countries. Taken with the more direct evidence which Dr. Hammond has given us, it looks as if the male susceptibility to this disease is at least as much the result of our vices as of our hormones.

This is not to suggest that dietary fat is not important. It simply means that the dietary habit patterns will not explain all the observed facts of the distribution of ischemic heart disease mortality. But it may be that the various theories of causation are not necessarily mutually exclusive. From his observations on the fate of thrombi in the wall of coronary vessels, Professor Duguid of Newcastle, inferred that thrombosis rather than atheroma was the essential lesion in infarction leading to death. And this view agrees with some, at least, of the epidemiological evidence. Morris, for example, has shown that the increased incidence of cardiac infarction and rupture found at post mortem in the London Hospital was not accompanied during the same period of time by any increase in the frequency of finding atheroma and calcification.

The relationships found between quite varied factors and coronary disease suggest that there is no single explanation of all the observed facts about the natural history of ischemic heart disease. It seems that we are dealing with a disease or a group of diseases whose evolution among individuals predisposed by constitution is furthered by the cumulative effects of different factors altering, perhaps, the blood clotting mechanism.

Some factors, like high fat meals, may accelerate clotting, while others like cigarette smoke may accentuate its effect perhaps by interfering with the lysis of clot. Exercise or, as Dr. Marmorston has just told us, an adequate supply of estrogens may modify the functional results of these failures in the clotting mechanism.

The epidemiological evidence is still not quite strong enough to incriminate any particular agent as the major determinant of coronary disease. The verdict must be that very canny Scots one, of "non-proven." But if I had to hazard a guess, my bet would be that the most readily alterable and important environmental factor in ischemic heart disease is cigarette smoking.

Dr. Reid is professor of epidemiology, London School of Hygiene and Tropical Medicine, University of London, London, England.

SUMMARY

Irving S. Wright, M.D.

SUMMARIZING this symposium is a project of some magnitude. In order to achieve some semblance of order I will not have time to challenge adequately all statements which are open to question and some of the questions which I will raise cannot be answered here, nor indeed at all with our present knowledge.

Let us start with the first presentation. Everything about man seems to begin with genetics. Dr. Böök gave us a very fine presentation. It seemed clear to me, however, that the evidence for a genetic basis for heart disease, aside from those cases due to familial hyperlipemia, is rather sketchy. It involves so few people that it is difficult to know whether there is something significant here or not. Dr. Böök properly emphasized many other factors which get into this picture during the woman's pregnancy, for example, various infections which produce deformities. What may appear to be congenital to the uninitiated, sophisticated investigators, who are not content merely with national statistics have found on inquiry that a substantial number of women giving birth to abnormal children have had rubella or other viral infections during pregnancy.

I should also like to raise the question whether in the future we should not give more thought to the role of the so-called phenomenon of transduction or virogenetic transfer. So far as I know, very little has been made of this in human genetics, but there is considerable interest as it applies to lower forms.

The aspect of Dr. Böök's report concerned with hyperlipemia seems to be on a very much firmer basis. There are without any question, families in which hyperlipemia occurs in a high percentage of members. These families have a higher than average incidence of cardiac and cerebral catastrophies. This is a very important group for study.

I believe that Dr. Freis will agree that there are families in which for unexplained reasons hypertension also seems to be common. We have studied families in which one can safely predict that the next generation will almost certainly include some cases with hypertension. And, in turn, those cases will play a part in the ultimate cardiovascular catastrophe rate.

Dr. Mayer gave us an excellent and critical analysis of the relationship between diet, obesity, and various other factors to heart disease. There is a strong presumption when one considers a hundred thousand people that incidence of coronary artery disease is related to serum cholesterol levels. When, however, one tries to apply this idea to individual patients, or small groups, it is not so conclusive. Therefore, a physician cannot be too sure that his specific recommendations to an individual patient will have a profound effect on the longevity of that patient.

It is true, as Dr. Stamler brought out, that there is a very complicated interrelationship of many factors. It is not just a matter of total calories. It may be the total amount of fat, the ratio of saturated fats, cholesterol, and refined carbohydrates, and many other of the factors that have been mentioned in this symposium, such as: "How are your hormones?" and "Do you smoke excessively?" As was properly emphasized, the person who smokes excessively tends to lead a life of higher tension. In this category, males seem to be hit the hardest. Characteristically, these men exhibit high tension and drive. They are men who frequently eat too much, drink

too much, sleep too little, work too hard, and get themselves into all kinds of stressful situations, and if one is not handy, they go out and find one. You can see them at any hotel desk arguing with the manager about the extra egg that was put on their bill, getting red-faced and aggravated about something that is of no consequence in terms of their life except maybe the cholesterol in the egg. So, we have these multiple factors. Dr. Freis emphasized this too. It should be mentioned, however, that hypertension in itself does not necessarily carry a very bad risk. Despite his statement, which is correct, that the mortality and morbidity rate is much higher in people with high blood pressure, there are individuals who are more interesting to me because they seem to defy this trend.

These are patients who have a capacity to tolerate high blood pressure. I have observed several of them in my practice for many years. One woman is now in her eightieth year; she is a great grandmother four times. For more than 35 years her blood pressure has never been less than 240 systolic and never been less than 130 diastolic. She has never had a stroke nor a heart attack; about once a month she comes down 30 miles from Greenwich to see me and because she enjoys the trip by herself at 80.

This woman is possibly more important, scientifically, than those who do the expected. What does she have that gives her this protection that 90 per cent of the people do not have? If she had a sympathectomy 20 years ago, the surgeons would be demonstrating her all over the country showing the results of her sympathectomy.

If Dr. Freis's fine medicines, and they do help most patients, had agreed with her, her fine health would have been attributed to them. But actually they all disagree with her. She cannot tolerate them, and she does much better when her blood pressure is at high levels. When, occasionally, it does go down a little she gets very depressed and feels terrible. Her pressure has been above 300 systolic on many occasions, but she has still to develop a complication from this.

I would like at this time to enter a little dissent from one statement that Dr. Stamler made. He implied that 30 per cent of first coronary attacks are fatal. Now, this may be true in the Cook County Hospital or in some other large city hospitals where so many cases are brought in off the streets severely ill or dead on arrival. I have grave doubts that this figure is valid for the nation as a whole.

A large percentage of patients who have myocardial infarctions are not sick enough to be taken to the hospital. Many of these infarctions are unrecognized. Anyone seeing enough autopsies cannot avoid being impressed by the numerous scars in the heart muscle produced by former infarctions that were so mild they were never recognized clinically. In our series of clinically recognized cases, with the use of anticoagulant therapy, the mortality rate is between 10 and 15 per cent and is steadily going down. Therefore, it seems to me that 30 per cent is too high a rate and that somewhere between 5 and 15 per cent will ultimately prove to be more correct. I say this in full recognition of the deaths which occur suddenly outside of hospitals.

While reviewing this symposium critically and yet constructively, I cannot refrain from commenting on certain facets of this great problem which should be considered more completely by the American Public Health Association. It will obviously be a long time before the human race will be able to effect in any significant way the genetic aspects of cardiovascular disease.

In order to be effective, prevention by diet may have to be started in infancy

or shortly thereafter. There is at present little proof that the prognosis of a person who has had one or two heart attacks will actually be affected significantly if he is placed on a diet which is low in cholesterol. There is a little evidence in this general direction, but it is sparse. The effects of dietary change are not as convincing as Dr. Hammond's figures on the cessation of smoking. I would like to comment on the point that he made about the seeming lack of response during the first year. I think his explanation is quite possibly correct.

Thousands of people are being told to stop smoking because they have either had a little stroke or a mild heart attack. These people move ahead to their catastrophe despite their abstinence and therefore the rate continues to be high and it is not until later years that the beneficial effects become more apparent. Several reasons for this might be raised for speculation if we had the time.

Dr. Hammond expressed the hope that the lowering of the nicotine in cigarettes will have a favorable effect on the heart rate. However, I would like to mention that 25 years ago, when we first did the experiments which demonstrated the vasoconstriction of the peripheral blood vessels following smoking, we also tested the so-called denicotinized cigarette of the time, which had 40 per cent of the nicotine as compared to the average cigarette.

The vasoconstriction at the fingertips was just as pronounced from smoking the cigarette from which the smoker theoretically got only 40 per cent as much nicotine. This is recorded in our little book on vascular disease. The most minute amounts of nicotine produced measurable vasoconstriction of the peripheral vessels. Deep inhalation was not necessary. It was absorbed easily from the mucous membranes of the mouth. I am not certain whether, if nicotine is the key factor, we are going to get as much effect as one might think by reducing the content, so long as an appreciable amount is present.

At the same time, we studied the effect of nicotine on dogs. Nicotine is a very potent poison and a drop of highly diluted nicotine sulfate solution placed on the gum of a dog will kill it immediately. One does not have to take the smoke into the lungs to produce a vascular reaction.

Interest in the prevention of these diseases should not be limited to the first attack because the patient frequently suffers from recurrent or continuing disability for years. At present between 80 and 90 per cent of patients survive their first attack and many of them are able to return to their former occupations. We should be even more interested in preventing the second, third, and fourth attacks, any one of which may produce chronic invalidism or death. Any one of these may terminate the patient's life abruptly, or by a succession of attacks over a period of years, he may die slowly.

We now have weapons to interrupt this progress and they should be used. I thank Dr. Reid for introducing the mechanism of thrombosis since most of these patients die or have their final episode on the basis of thrombosis, superimposed on atherosclerosis. I am not belittling the importance of atherosclerosis, but a patient can have atherosclerosis for a great many years without disability, or even awareness of it, so long as the blood can filter through rather small channels. The final closure due to clotting is the event that most often disables or kills.

There are now approximately two million people in the United States who have had strokes as far as we can tell from comparable studies. Eighty per cent or more of these strokes have been associated with a clot. For the sake of this discussion, we may say that in 80 per cent of the two million, a clot has been the critical factor. The remainder

have occurred on the basis of hemorrhage, aneurysms, and various other pathological conditions.

A million people or more per year suffer from myocardial infarctions. We do not know the exact figure because, as I have said, many are unrecognized. In 73 per cent of the cases autopsied in our study of 1,031 cases of infarction, the final closure was due to a clot (a thrombosis). This was the terminal event.

We do have weapons to deal with this situation. Anticoagulant drugs have been shown in studies in many countries of the world (including Soviet Russia, where they repeated our study published in 1954 for the American Heart Association with identical results) that the usual untreated death rate can be reduced by a third, and the complication rate during the first six weeks by approximately four-fifths. But that is not the most significant point in terms of preventive medicine.

The long-term use of these drugs has a favorable effect on the outlook of these patients. We reported this before at the European Congress of Cardiology in London in 1953. Professor Paul Owren has obtained similar results in Norway. Swedish workers also confirmed this. The British National Medical Research Council then set up a very capable Working Party Committee with Sir George Pickering as chairman. In a comprehensive two-year study they found, I think to the surprise of some members of the group, that for men under 55 who had initial coronary attacks the recurrence in those treated with anticoagulants was one-fifth of that for those who were not treated. Over the age of 55, the recurrence was halved. Dr. Reid of the London School of Hygiene, served as the chief statistical adviser to this study.

These results shocked some people into a realization of some facts, but they produced an important question. How are we going to provide care for this enormous number of people? Dr. Douglas of Glasgow, secretary of the committee, estimated that in order to give anticoagulants to everyone in Great Britain who has had a myocardial infarction within two years and who seems to need them, one would have to treat approximately half a million people. The initial cost of the first year would be more than six million pounds.

These are figures for Great Britain. We can multiply them by four or five times for the United States. Obviously this is very complicated and does not lend itself to ready solution. I have found that with a few notable exceptions, public health workers have veered away from this problem frequently because it is complex. Nevertheless, it involves millions of people and cannot continue to be ignored.

We need more laboratories where accurate prothrombin tests can be performed. Public health agencies could set up reference laboratories in many areas so that physicians and technicians would be able to determine whether their laboratories were accurate. Because of lack of time, I cannot go into all of the possibilities. In conclusion I should like to quote from the distinguished German scientist, Max Planck, who said, "A new scientific truth does not triumph by convincing its opponents, but rather because its opponents die, and a new generation grows up that is familiar with it." This is applicable to many of the new ideas we have been discussing, but let us not retard further the sluggish movement forward. We should rather make a great effort to cast aside the millstone labeled "Love for status quo" which most of mankind carries at all times.

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